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NO. 1

ORIGINAL COMMUNICATIONS.

PHARMACOLOGIC ACTION OF ECBOLIC DRUGS.*

BY

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(With twenty-four Illustrations.)

WITHIN the past few years our knowledge of the chemistry and pharmacology of the ecbolics has been greatly advanced. Nearly all of the contributions have appeared in journals which are not readily accessible to the general practitioner. It is, therefore, my purpose to review briefly the more important papers; to demonstrate and discuss the action of some of the oxytocics on the circulation and on the isolated uterus; and to indicate their therapeutic employment.

In order to interpret the accompanying tracings, it is necessary to understand, in a general way, how the experiments have been carried out. A dog is anesthetized with morphine and chloretone, tracheotomy performed, and artificial respiration instituted. The blood pressure is recorded by means of a mercury manometer connected with a cannula which is inserted into the carotid artery. A cannula tied into the external jugular vein serves for the introduction of the drugs.

To record the movements of the auricle and ventricle two Cushny myocardiographs are employed. One of these is diagrammatically represented in Fig. 1. It consists of a vertical rod, AF, which is connected by the universal joint, F, to the supporting rod K. A cross-piece, CE, whose relation to A can be varied at will, carries

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LIEB: PHARMACOLOGIC ACTION OF ECBOLIC DRUGS

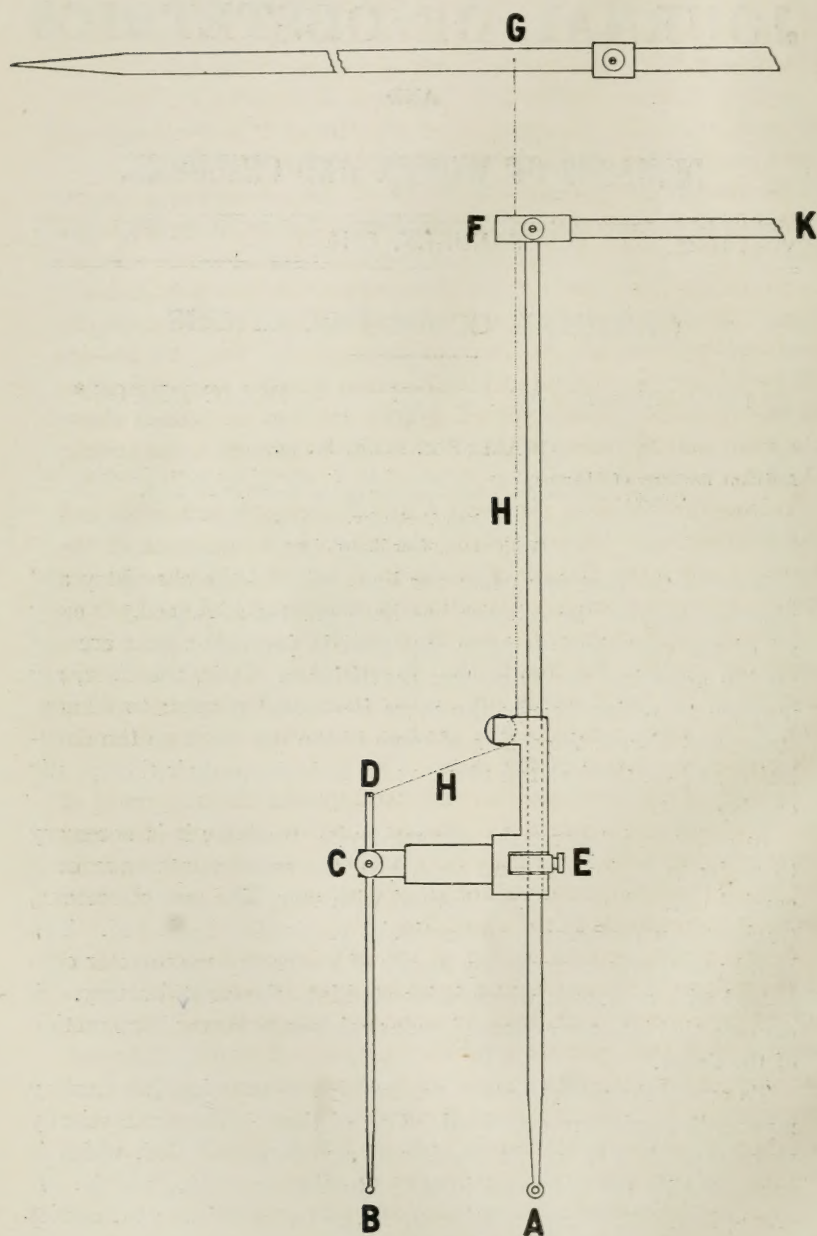


FIG 1.—Cushny Myocardiograph.

on its free extremity the lever BD. A thread, H, passing over a small pulley connects D with the spring recording lever G. When B is made to approach A, D moves away from AF. This movement is transmitted to the recording lever by means of the thread H and the lever is drawn downward. When B is moved away from A, D approaches AF. The tension on the thread H is decreased and the spring of the recording lever draws the lever upward.

To attach this apparatus to the heart, the pericardial sac is exposed by an incision through the midsternal line and is opened in the sagittal plane. The cut edges of the pericardium are then stitched to the periosteum of the sternum, forming a pocket in which the heart rests. A stitch is taken through the tip of the auricular appendix and another through the body of the auricle. Two stitches are taken through the visceral pericardium near the right and left borders of the ventricle. The myocardiographs are then suspended above the heart and by means of the stitches one is fastened to the auricle, the other to the ventricle.

During the systole of the heart A and B approach each other and the contraction is shown on the chart by the downstroke of the lever. During the diastole of the heart A and B are separated and the lever moves upward. Variations in the strength of the systoles are shown by changes in the length of the excursion: the more complete the systole, the longer the downstroke. Variations in the diastole of the heart are shown by variations in the upper limiting line. The more complete the cardiac relaxation during diastole, the greater the ascent of the lever.

In each of the accompanying myocardiograms, the uppermost of the three tracings is a record of the auricular contractions; the next lower represents the ventricular contractions; the third tracing from the top of the figure is that of the blood pressure. The zero of blood pressure corresponds to the signal line.

A very simple apparatus (Fig. 2) serves to record the movements of the isolated uterus. A glass cylinder, open at both ends, is supported in a water bath kept at constant temperature. Into the lower end of this cylinder a rubber stopper is inserted. Through the stopper are placed two glass tubes, one of which may be used to introduce or to siphon away Ringer's solution. The other tube is drawn to a fine point, which projects about 2 mm. above the stopper and serves for the introduction of oxygen.

To prepare the uterus for an experiment, it is removed as quickly as possible from the decapitated guinea-pig and transferred to Ringer's solution which is kept at a constant temperature. An in-

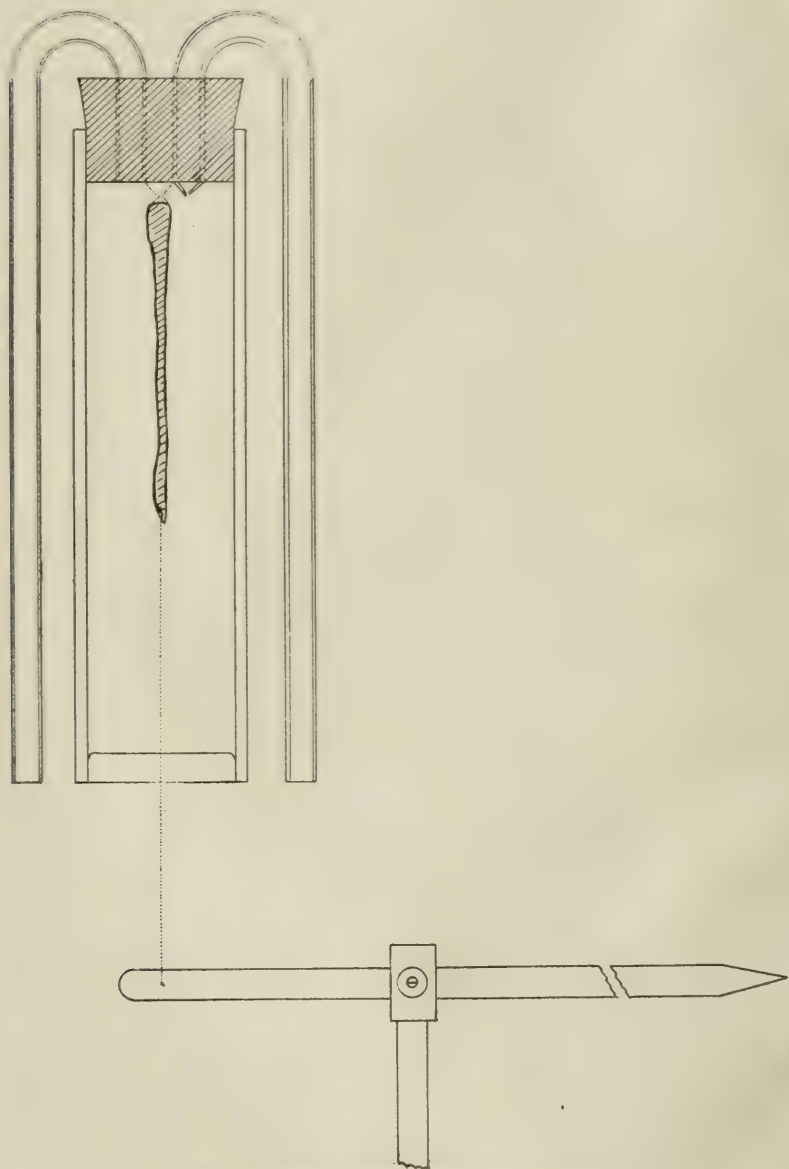


FIG. 2.—Isolated uterus suspended in vessel.

cision parallel with the long axis of the body of the uterus separates the two horns, and the more active segment is selected for the experiment. Two stitches are taken, one near the fimbriated extremity, the other through the body of the uterus, the threads being left long in each case. The uterus is fixed to the rubber stopper by one of the threads and is connected by the other to the recording lever, which is so weighted that the uterus is suspended in the Ringer's solution. Contraction of the uterus causes the writing point to move upward; relaxation of the organ is accompanied by descent of the lever.

The guinea-pig uterus has been selected for most of the experiments because it reacts in the same direction as the human uterus; that is, measures which cause an increase or decrease in the activity of the one produce an increase or decrease in the activity of the other.

A very brief review of the physiology of the uterus may not be amiss. The uterus, *in situ*, as well as when removed from the body, contracts and relaxes rhythmically. These movements are of myogenic origin; that is, they originate within the uterus itself and are not due to periodic stimuli received from the central nervous system. The uterine contractions are, however, under the control of the central nervous system, motor and inhibitory impulses reaching the organ by way of the hypogastric and pelvic nerves. The movements of the uterus may be affected directly by drugs or reflexly through the central nervous system. All substances which stimulate intestinal peristalsis increase reflexly the activity of the uterus. The uterine colic which results from irritant cathartics or emmenagogue oils is not due to direct stimulation of the uterus but is purely reflex.

I. ERGOT.

The variability in the strength of the pharmaceutical preparations of ergot has led to numerous attempts to isolate the active constituents.

Tanret in 1875 obtained from ergot a crystalline alkaloid which he called ergotinine and which he considered the active principle. Mixed with the crystals were numerous amorphous particles which he regarded as a physical modification of the crystalline substance. Subsequent study showed that this crystalline ergotinine was therapeutically and pharmacologically inactive. Attention was therefore diverted from the crystalline substance to the resinous principles.

Kehrer isolated from ergot an inert substance which he called ergotinic acid, and two other substances which proved therapeutically active. Both his sphacelinic acid and his cornutin cause a rise in blood pressure, cyanosis of the cock's comb, and contraction of the uterus. Cornutin, in addition, produces convulsions in the lower animals, and it is to this constituent that the convulsions of ergotism were at one time ascribed.

In 1896 Jacobi isolated a resin which he called sphacelotoxin. This resin does not exist as such in ergot but, combined with two

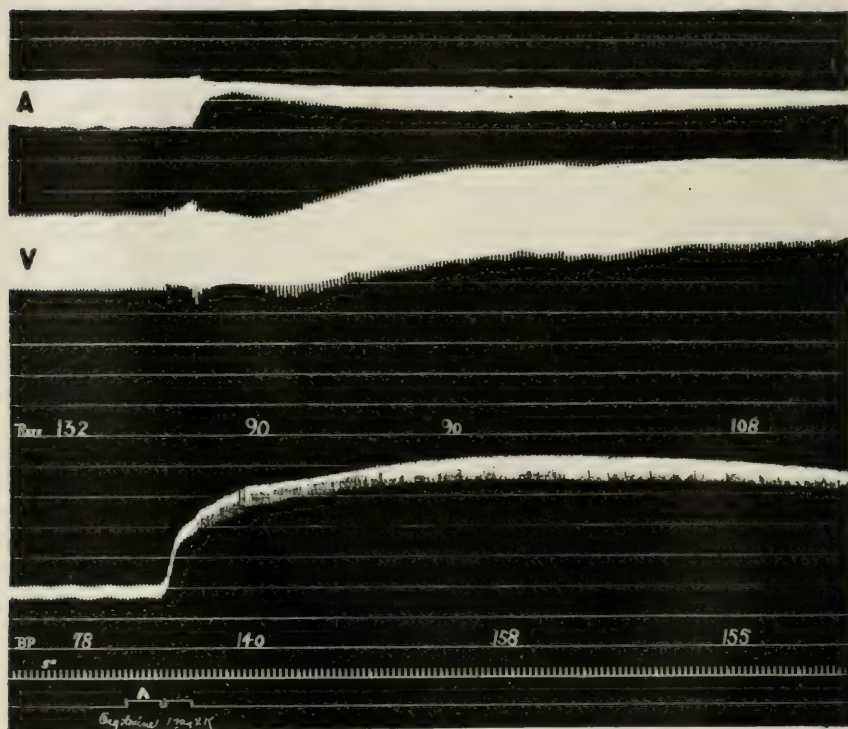


FIG. 3.—Dog. Myocardiogram. A. Ergotoxine phosphate, 1 mg. X K.

inert substances (secaline and ergochrysin), is present as secalinotoxin and chrysotoxin. Sphacelotoxin, "physiologically pure" or in combination, produces a rise in blood pressure, gangrene of the cock's comb, and contraction of the uterus.

Therapeutically these substances did not seem to represent the full action of the drug, so the subject was further investigated by Kraft(1) in 1906 and in the following year by Barger, Carr(2) and Dale. (3)

Kraft isolated from ergot a substance which he called hydro-ergotinine to indicate its chemical relation to Tanret's crystalline ergotinine. Barger and Carr recovered the same substance and called it ergotoxine. This ergotoxine is identical with the amorphous substance which Tanret had noticed mixed with his crystalline ergotinine but which he erroneously regarded as a physical modification of his crystalline alkaloid and therapeutically and pharmacologically inert.

Ergotoxine injected intravenously into a dog in doses of 1 mg. per kilo causes almost immediately a pronounced rise in blood pressure with a considerable slowing and weakening of the heart (see Fig. 3).

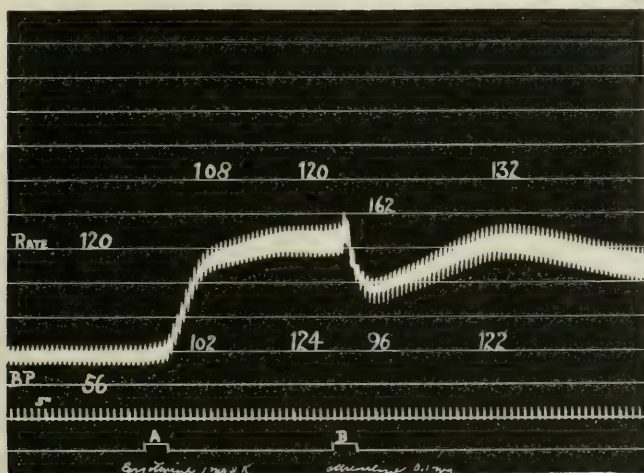


FIG. 4.—Decerebrate cat. Blood pressure. A. Ergotoxine phosphate 1 mg. X K. B. Epinephrine, 0.1 mg.

If the vagus is particularly active, the slowing of the heart becomes excessive and may interfere materially with the rise in blood pressure. The rise in pressure occurs in a cat whose brain and spinal cord have been destroyed (cf. Fig. 4). It is therefore independent of the central nervous system and must be of peripheral origin.

A second injection of ergotoxine is always followed by a less pronounced rise in pressure; in fact, no change may occur. The first dose has apparently paralyzed the mechanism through which the rise is usually brought about.

The rise in blood pressure and general vasoconstriction (Fig. 7, A) which follow the intravenous injection of epinephrine are due to stimulation of the vasomotor myoneural junctions of the thoracico-lumbar system. There is at the same time a stimulation of the

dilator endings in the blood-vessels, but this stimulation is entirely masked by the powerful action of the constrictors. The stimulation of the vasodilators is more lasting than that of the constrictors and explains the secondary hyperemia which so frequently follows the local application of epinephrine to congested mucous membrane.

After sufficiently large doses of ergotoxine, the intravenous injection of epinephrine is not followed by a rise in blood pressure but by a fall, the so-called "vasomotor reversal"⁽³⁾ (Fig. 4). The fall in blood pressure is due to a dilatation of the abdominal viscera and the extremities. The injection of ergotoxine has, therefore, rendered the vasoconstrictor endings insusceptible to epinephrine but has left the dilator endings intact. Barger and Dale⁽⁴⁾ conclude

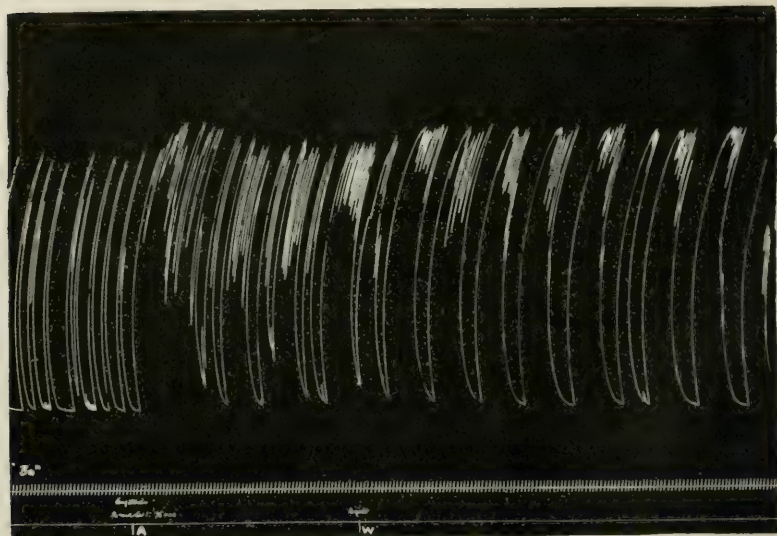


FIG. 5.—Isolated uterus, virgin guinea-pig. Upstroke-contraction. A. Ergotoxine phosphate to make 1:75,000. W. Fresh Ringer's solution.

that ergotoxine first stimulates and then paralyzes motor myoneural junctions and that this action is limited to those nerve endings which are connected with the true sympathetic system.

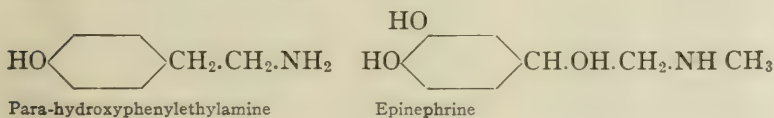
On the isolated uterus of a guinea-pig, beating rhythmically in 75 c.c. of Ringer's solution, the introduction of 1 mg. of ergotoxine produces almost immediately an increase in the rate of the contractions as well as an increase in their strength (Fig. 5). Furthermore, there is a definite improvement in the tonus; that is, the relaxation becomes very much less complete. The action persists longer than with most drugs and is not readily removed by washing. Injected

into pregnant animals near term, ergotoxine produces tetanus of the uterus but not abortion.

The employment of ergotoxine during labor has not been followed by satisfactory results. Gordon Sharp(5) injected subcutaneously and intramuscularly doses of 1/100 gr. of ergotoxine and found that uterine stimulation was evident much earlier than after an aqueous preparation of whole ergot. The pains were more intense but the effect, unfortunately, was much less persistent.

Kehrer(6) recorded the contractions of the human uterus in labor by means of a manometer connected with a bag filled with air which was placed between the neck of the fetus and the dilated cervix. He injected subcutaneously or intramuscularly ergotoxine in doses of from 1 to 2 mg. but could find no effect on the rate or the strength of the contractions.

These therapeutic experiments suggest that ergotoxine does not represent the full action of ergot. Furthermore, the rise in blood pressure which follows the injection of an ergot preparation is much greater than can be explained by the ergotoxine present in the preparation. Barger and Dale(7) have shown that the rise in blood pressure is due to several amines. The most important of these is para-hydroxyphenylethylamine, one of the sympathonimetic amines. A comparison of its graphic formula with that of epinephrine shows that the two drugs are closely related



Injected into the veins of a dog, para-hydroxyphenylethylamine produces a sharp rise in blood pressure, which reaches its maximum a minute or two after the drug has been introduced (Figs. 6 and 7, B). This rise in pressure is not due to cardiac stimulation (Fig. 6) but, like that from epinephrine, results from a general vasoconstriction. A comparison of A and B, Fig. 7, shows, however, that the action of this drug differs considerably from that of epinephrine. The maximal rise in pressure is reached much later than after epinephrine and the duration of the rise is much greater. It is also claimed that circulatory stimulation follows the oral and subcutaneous administration of para-hydroxyphenylethylamine. Epinephrine, when so administered, is without effect on the circulation.

On the isolated uterus, para-hydroxyphenylethylamine may cause simply an increase in the rate of the contractions, well shown in

Fig. 8, or it may induce in addition a more complete contraction and a distinct increase in the tonus (Fig. 9). The action resembles that of ergotoxine in that its effect is not readily removed.

The reports of its clinical use are conflicting. Dale and Dixon(8)

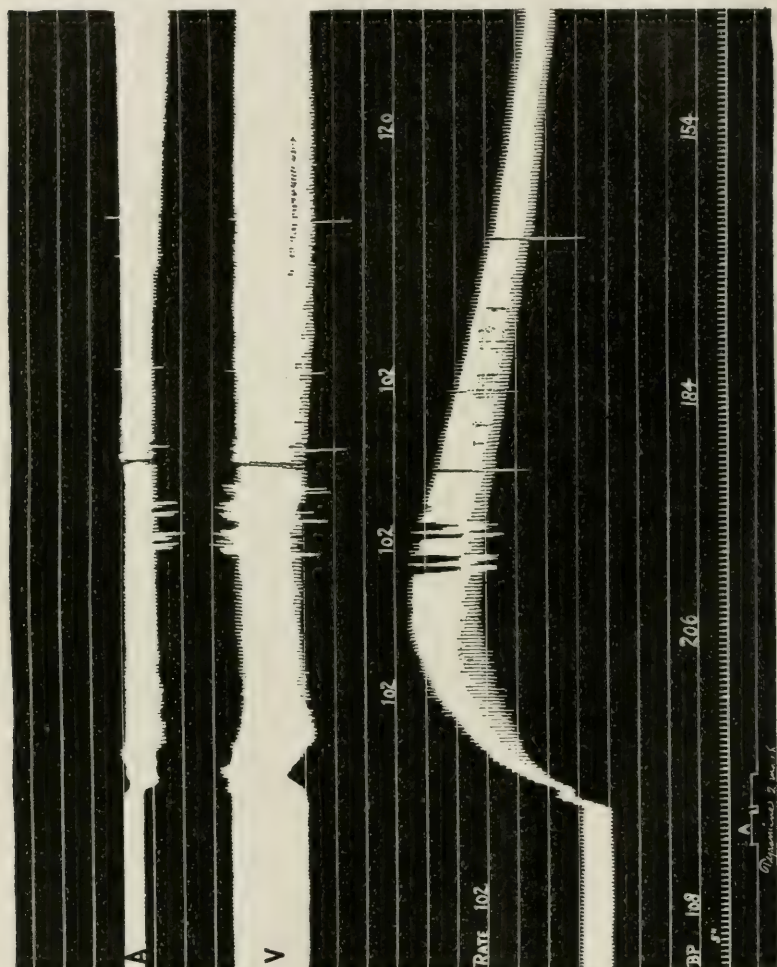


FIG. 6.—Dog. Myocardiogram. A. Para-hydroxyphenylethylamine, 2 mg. X K.

report that 10 mg. of para-hydroxyphenylethylamine by mouth raised blood pressure from 110 to 149 mm. Hg at the end of fifteen minutes, and that forty minutes later the blood pressure was still above normal. No other investigator has seen such a pronounced effect. Indeed, Sharp found that the oral or subcutaneous adminis-

tration of from 5 to 20 mg. of para-hydroxyphenylethylamine had no effect on blood pressure or heart rate.

Clark(9) reports that in health 10 to 30 mg. by mouth produced no change in the circulation. In one case, 100 mg. did not influence the blood pressure within forty minutes and this dose was then repeated, still without effect. Clark suggests that the marked rise in blood pressure which Dale and Dixon obtained from 10 mg. of para-hydroxyphenylethylamine was due solely to psychic influences. Injected under the skin, para-hydroxyphenylethylamine produced a local reaction almost identical with that following epinephrine. Doses of 15 mg. subcutaneously were without effect on blood pressure but after larger doses a distinct transitory rise was obtained. Ten minutes after the subcutaneous injection of 50 mg., blood pressure had risen from 110 to 165 mm. Hg, to return to normal at the end of half an hour. These results were very encouraging, but when the drug was administered to patients in collapse, even in large doses (70 mg.), it produced only transitory improvement in the circulation.

Clark's results have recently been confirmed by Hoyt(10). The reported observations are too few to be of much value but are very suggestive and indicate that further study is needed. The reports of its action during labor are less encouraging. Sharp and Kehrer(6) conclude that para-hydroxyphenylethylamine in doses of from 5 to 20 mg. has no effect on the frequency or the strength of the contractions of the parturient uterus.

Ergotoxine and para-hydroxyphenylethylamine account for the effect of ergot preparations on blood pressure but do not explain the striking action on the uterus. Further investigation of ergot led Barger and Dale(11) to suggest that this was due chiefly to beta-imidoazolyethylamine. Injected intravenously into dogs in doses of 0.1 mg. per kilo, this substance produces an immediate and prolonged fall in blood pressure associated with peripheral vasodilatation (Fig. 10). The fall in pressure cannot be ascribed to the heart, for despite its slowing the output per minute is increased. Nor is it due to an action on the vessel wall, since isolated vessels react by constriction. The fall occurs after destruction of the central nervous system, and must be due to some unexplained general vasodilatation of peripheral origin. An examination of the blood-pressure curve in Fig. 10 shows that just before the maximal fall is reached the respiratory excursions cease for twenty to thirty seconds and are only gradually recovered. Injected into an unanesthetized animal, beta-imidoazolyethylamine causes violent respiratory disturbances, from which the animal may die. After death the lungs are found

abnormally distended with air. This condition, especially in conjunction with other symptoms that are present, shows a striking resemblance to anaphylactic shock.

On the isolated uterus of the guinea-pig, beta-imidoazolyethylamine

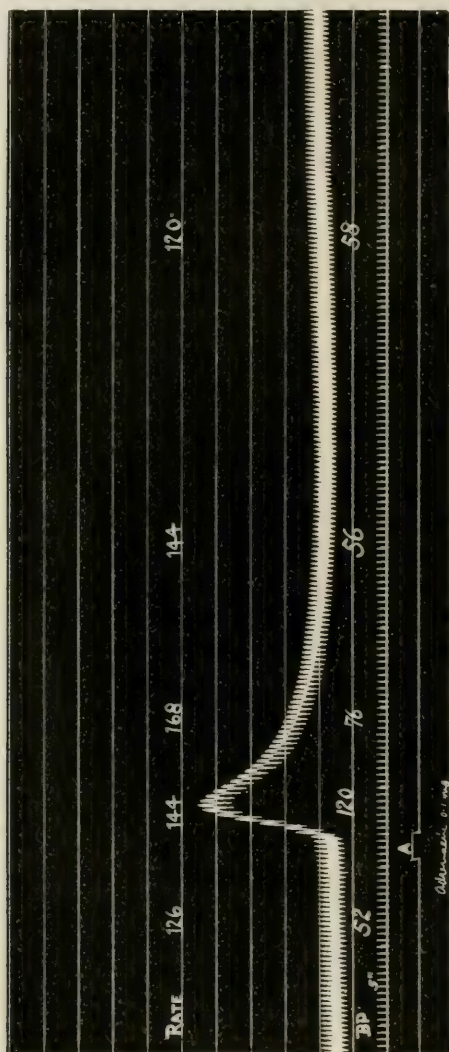


FIG. 7, A.

produces, in concentration of 1:600,000, a marked contraction with cessation of rhythm in maximal tonus (Fig. 11, B). The tetanus is soon broken, however, by incomplete relaxations. The uterine

contractions return to normal almost as soon as the drug has been removed. Injected into pregnant animals near term, beta-imidoazolyethylamine causes tetanus of the uterus and asphyxiation of the fetus. Abortion occurs only after the death of the embryo.

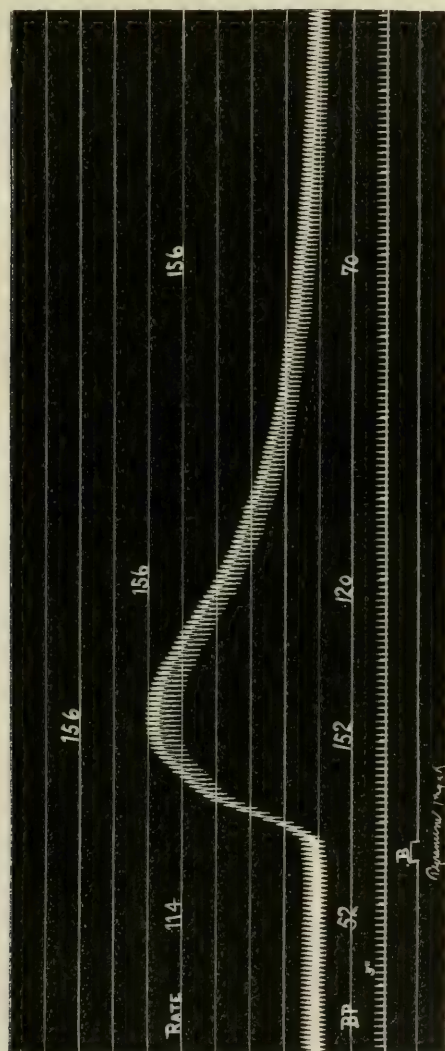


FIG. 7, A and B.—Decerebrate cat. Blood pressure. A. Epinephrine, 0.1 mg. B. Para-hydroxyphenylethylamine, 1 mg. X K.

Kehrer(6) found that during labor beta-imidoazolyethylamine in doses of 0.5 mg. was quite without effect on uterine contractions, and that doses of from 1 to 2 mg. led to respiratory disturbances

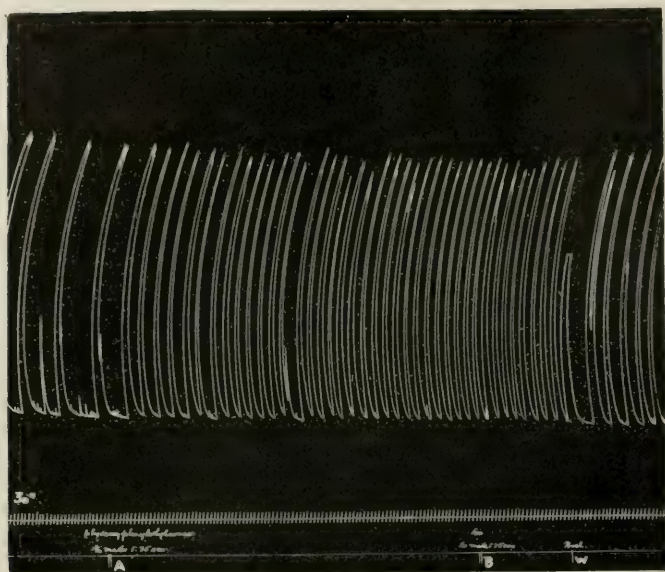


FIG. 8.—Isolated uterus of virgin guinea-pig. Upstroke-contraction. A. Para-hydroxyphenylethylamine to make 1 : 75,000. B. Para-hydroxyphenylethylamine to make 1 : 25,000. W. Fresh Ringer's solution.

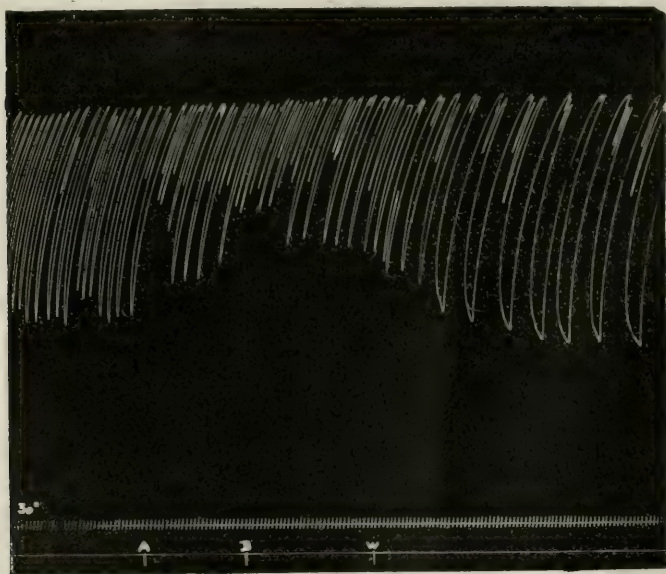


FIG. 9.—Isolated uterus, pregnant guinea-pig, twenty-four hours postmortem. Upstroke-contraction. A. Para-hydroxyphenylethylamine to make 2 : 95,000. B. Para-hydroxyphenylethylamine to make 6 : 95,000. W. Fresh Ringer's solution.

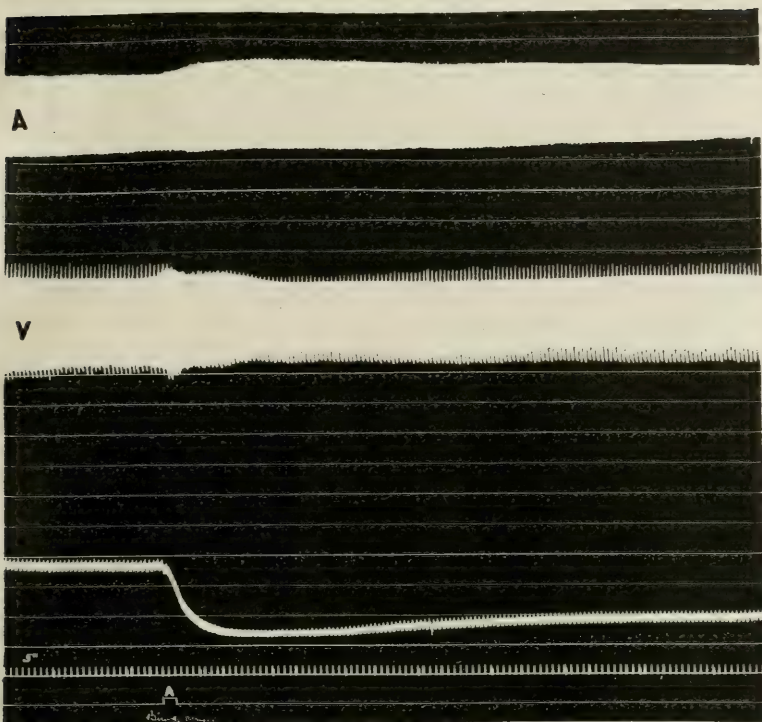


FIG. 10.—Dog. Myocardiogram. A. Beta-imidoazolyethylamine, 0.1 mg. X K.

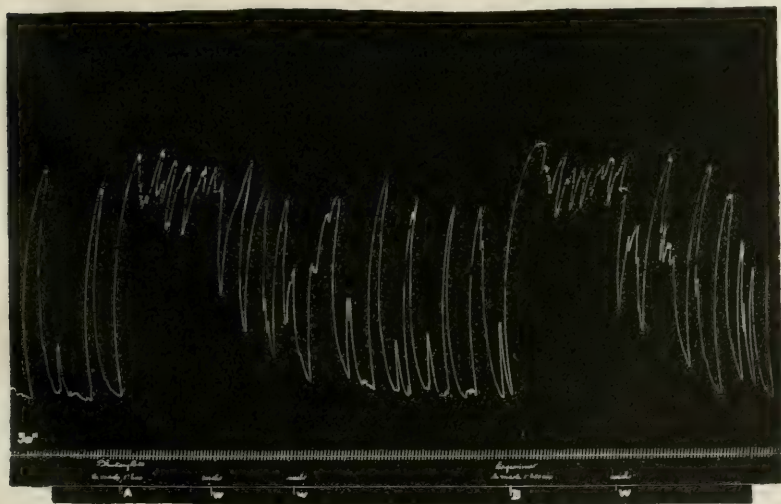


FIG. 11.—Isolated uterus of virgin guinea-pig. Upstroke-contraction. A. Pituitary extract to make 1 : 600. W. Fresh Ringer's solution. B. Beta-imidoazolyethylamine to make 1 : 600,000.

and convulsions with only a slight stimulation of the uterus. He warns against the use of this drug as entirely too dangerous.

The action of Galenical preparations of ergot may be explained as follows: the initial fall in pressure which often occurs after their intravenous injection is due chiefly to the beta-imidoazolyethylamine, partly to the iso-amylamine; the marked and prolonged rise is due almost entirely to the para-hydroxyphenylethylamine and only in small part to the ergotoxine. The vasomotor reversal and the bluing of the cock's comb are due solely to ergotoxine. The action on the uterus is referable to the ergotoxine, the para-hydroxyphenylethylamine, but essentially to the beta-imidoazolyethylamine.

The extreme variation in the activity of the ordinary pharmaceutical preparations is readily understood when it is remembered that chemical analysis has shown that in addition to the characteristic alkaloid, ergotoxine, and the amines mentioned, many other substances are present, some of which are depressant, others inactive. Chemical standardization of so complex a drug is, of course, out of the question.

The conflicting physiologic effects of these constituents make it apparent that no single method of physiologic standardization can be adequate. Three methods are at present advocated for the physiologic standardization of an ergot preparation: the determination of its action on blood pressure⁽¹²⁾, on the isolated uterus⁽¹³⁾, or on the cock's comb. This last method has been recommended by Edmunds and Hale⁽¹⁴⁾, who compared the three methods with the following results:

	Cock's comb	Uterus	Blood pressure rise, per cent.
Spanish ergot.....	5.0	5.0	51.0
Cornutol.....	5.0		
Russian ergot.....	6.5	6.0	50.0
Wyeth's ergot, purified.....	8.0		
Sharp and Dohme, fluid extract.....	10.0	11.0	83.0
Ergotole.....	15.0		
Parke Davis & Co., fluid extract.....	20.0	18.0	33.5
H. K. Mulford Co., fluid extract.....	20.0	20.0	38.0
Ergone.....	?	+ 50.0	7.0

The agreement here is remarkable, since the cock's comb test is essentially for ergotoxine, the blood pressure test for para-hydroxyphenylethylamine, and the uterine test for beta-imidoazolyethylamine.

Because their chemists have admitted the impossibility of properly standardizing ergot preparations, a well-known English firm has put upon the market a preparation which is of constant composition. It consists of a certain amount of ergotoxine, obtained from ergot, to which are added definite quantities of synthetic para-hydroxyphenylethylamine and beta-imidoazolyethylamine.

Although ergot is occasionally used to strengthen labor pains, the variability of its preparations makes its employment for this purpose dangerous, and it has been suggested that pituitary extract is the only drug which can be used with safety during the second stage of labor.

II. PITUITARY EXTRACT.

The two lobes of the pituitary gland are connected by the pars intermedia. The anterior lobe, glandular in structure, and more properly called the hypophysis, is essential to life but apparently devoid of pharmacologic action. The posterior lobe, or infundibulum, though apparently unnecessary to normal metabolism, has a very pronounced pharmacologic effect. Probably the active substance originates in the pars intermedia and is modified by the posterior lobe(15).

The intravenous injection of an extract of the posterior lobe of the pituitary gland is followed by a rise in blood pressure and a slowing and weakening of the heart(16) (Figs. 12 and 13). At B in Fig. 12 a small dose of atropine (just sufficient to paralyze the vagi) was injected, and almost at once there was an increase in the strength of the auricular and ventricular contractions. Similar effects follow section of the vagi (Fig. 13, B). The slowing and weakening of the heart must, therefore, be due to stimulation of the vagus center. Despite this slowing and weakening of the heart the blood pressure is increased. The abolition of the cardiac depression by atropine (Fig. 12) or by section of the vagi (Fig. 13) is associated with a prompt further rise in blood pressure. Because it occurs in a decapitated cat, the rise is not dependent on the central nervous system. Paralysis of the vasomotor myoneural junctions by ergotoxine does not prevent the increase in blood pressure, hence the vasoconstriction must be due to direct stimulation of the muscular coats of the vessels.

The subcutaneous or intravenous injection of infundibular extract is followed by an increase in the secretion of urine(17). At A, Fig. 13, pituitary extract was injected and, because of excessive

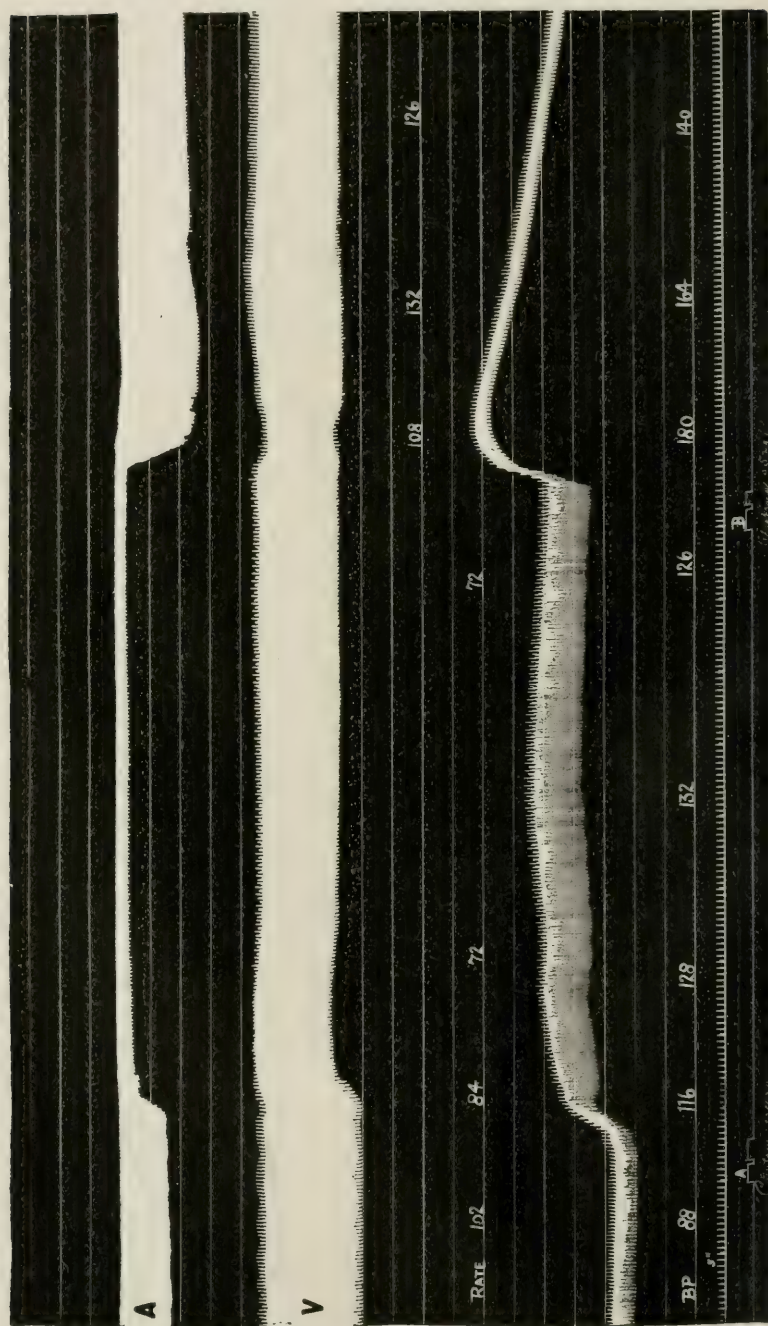


FIG. 12.—Dog. Myocardiogram. A. Pituitary extract, 0.05 c.c. X K. B. Atropine sulphate, 0.5 mg. X K.

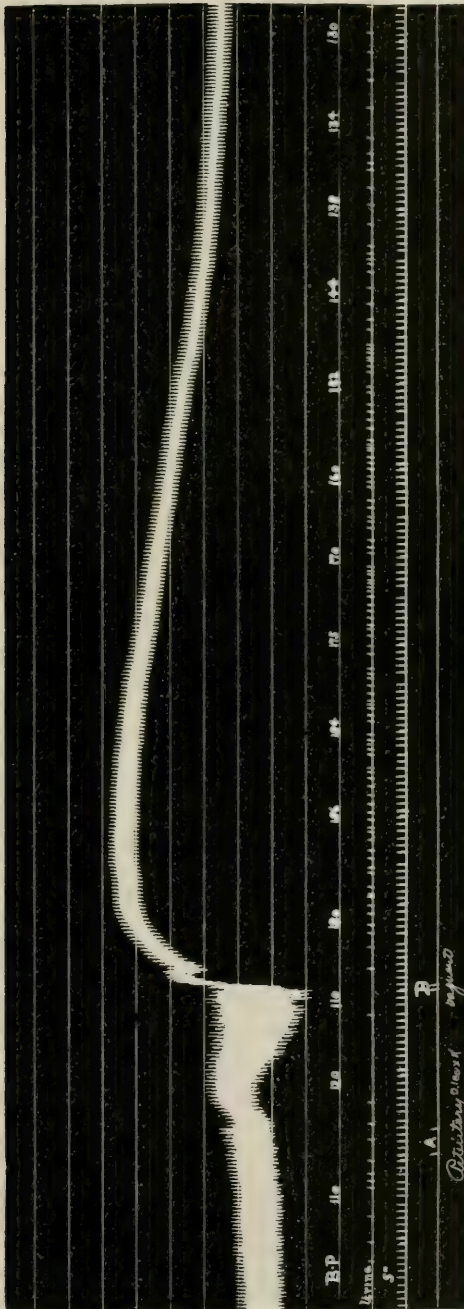


FIG. 13.—Dog. Blood pressure and urine. A. Pituitary extract, 0.1 c.c. X K. B. Both vagi cut,

cardiac depression, caused only a slight rise in blood pressure. The urine secretion was not increased. Section of the vagi, at B, was followed by a sudden increase in the blood pressure and a very profuse diuresis. This experiment suggests that the diuresis is secondary to the rise in blood pressure. On the other hand, it is claimed that a second injection of pituitary extract fails to change the blood pressure but produces a diuresis that is as marked as that which follows the first injection. The diuresis under these conditions cannot be due to changes in blood pressure but must be due to a specific substance which stimulates the kidney cells. It is unfortunate that we do not understand the exact mechanism by which pituitary substance induces the increase in the secretion of urine for it would indicate the conditions in which the drug might be employed.

The effect of pituitary extract on the isolated uterus is well seen in Fig. 11. The uterus was beating regularly and strongly in Ringer's solution. At A, pituitary extract was added to make 1:600. At once the uterus contracts very completely and passes into tetanus soon broken by incomplete relaxations. With fresh Ringer's solution (W) the normal rhythm is recovered. If pituitary extract is injected into pregnant animals it induces abortion.

Another effect of pituitary extract is of more interest than importance. Injected into a lactating animal it causes a prompt secretion of milk. This was at first regarded as an increase in the formation of milk, but Schäfer(18) has shown that the total quantity of milk secreted in twenty-four hours is not augmented. It has been suggested that pituitary extract stimulates the smooth muscle of the gland and the apparent increase in secretion is simply the expression of milk already formed and stored in the mammary gland.

The active principle of pituitary substance has not been identified. Indeed, it is not known whether all the effects induced by pituitary extract are brought about by one substance or by several. Fig. 11 suggests that the action on the uterus is due to a substance closely resembling, if not identical with, beta-imidoazolyethylamine. The whole question, however, needs further investigation.

[*Therapeutics*.—Pituitary extract may be applied locally to stop cozing hemorrhage or reduce congestion of the mucous membranes. It has also been advised in the treatment of conditions associated with low blood pressure, and is especially advocated by Bell(19) to combat shock and collapse. It finds its chief employment in obstetrics, and is especially indicated in uterine inertia. The subcutaneous or intramuscular injection of the extract terminated labor in 75 per cent. of the 719 cases collected by Quig-

ley(20), shortening materially the second stage. There is no evidence that pituitary induces labor or causes abortion, but if labor has begun it is of material assistance in emptying the uterus. It is said to be more valuable than ergot in postpartum hemorrhage and subinvolution. Pituitary extract should never be administered until the os is well dilated and then only when the relation of head to pelvis is normal. The chief dangers associated with its use are uterine tetanus and rupture and fetal asphyxiation and impaction.

Kehrer(6) declares that pituitary extract is the one drug that deserves the name of ecbolic, and that it fails only in the presence of degeneration of the uterine muscle.

Contraindications.—In cardiac disease or arteriosclerosis, where an abrupt rise in blood pressure is dangerous, pituitary extract is contraindicated.

Administration.—Pituitary extract is not absorbed through the mucous membrane, so local application is not followed by systemic reaction. It is readily destroyed by the ferments of the alimentary canal; therefore it cannot be administered by mouth. The subcutaneous or intramuscular injection is without effect upon the circulation but produces stimulation of uterus, kidney, and bowel. Injected intravenously it produces a prompt but transitory rise in blood pressure, slowing of the heart, diuresis, and uterine stimulation.

III. QUININE.

Quinine, introduced into obstetrics many years ago, has gradually fallen into disuse, and I was very much surprised indeed to find what a striking response the isolated uterus gave to very dilute solutions of this alkaloid. Fig. 14 shows the effect of increasing doses of this drug. At A, quinine was introduced to make 1:100,000. There was an immediate increase in the rate and strength of the contractions. The tonus was moderately improved. At B, the concentration was increased to 1:50,000 and there developed a tetanus which was broken by a fair degree of relaxation. At C, the concentration was made 1:25,000 and the uterus was immediately thrown into spasm and a few minutes afterward showed signs of poisoning and in the course of half an hour was dead. Fig. 15 represents the effect of quinine on the uterus of a pregnant dog. The animal had been used the day before for another experiment and the excised uterus was kept in Ringer's solution at 5° C. for thirteen hours. On suspending it in the chamber there were no evidences of spontaneous contractions for about ninety minutes.

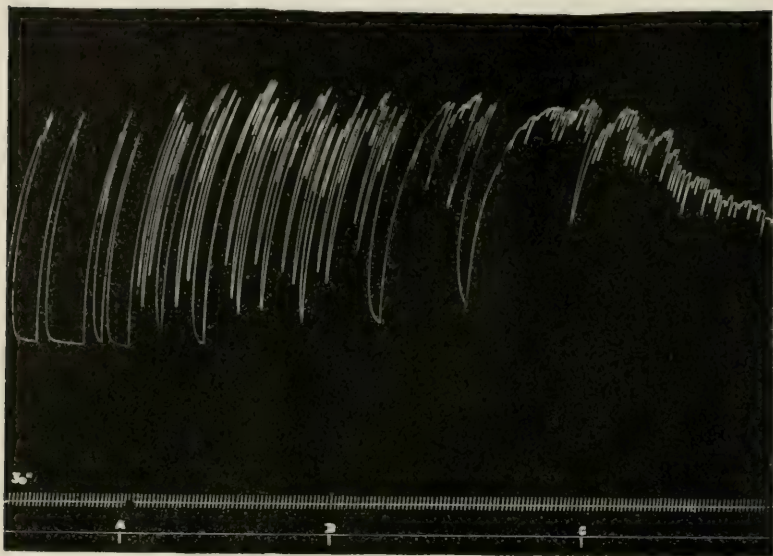


FIG. 14.—Isolated uterus of virgin guinea-pig. Upstroke-contraction. A. Quinine hydrochlorate to make 1 : 100,000. B. Quinine hydrochlorate to make 1 : 50,000. C. Quinine hydrochlorate to make 1 : 25,000.

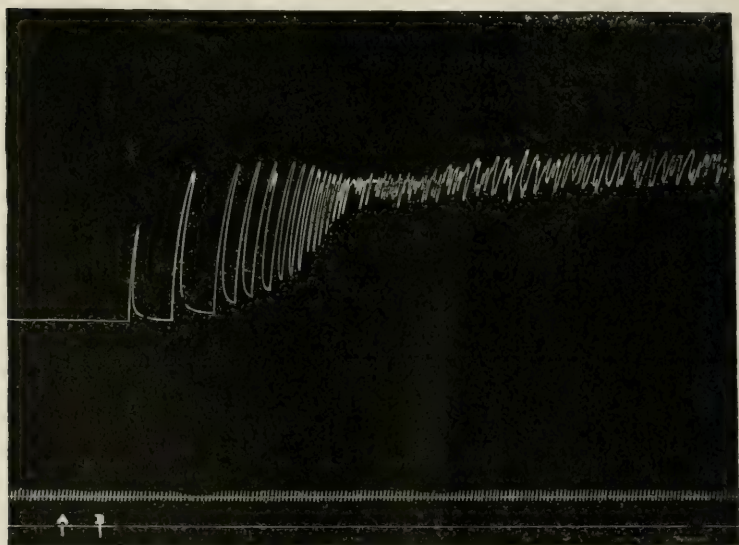


FIG. 15.—Isolated uterus, pregnant dog. Thirteen-hours post mortem. Upstroke-contraction. A. Quinine hydrochlorate to make 1 : 100,000. B. Quinine hydrochlorate to make 1 : 50,000.

Then, at A, quinine to make 1:100,000 was added, and a few minutes later the strength was increased to 1:50,000. Almost immediately there developed a few contractions which gradually increased in strength, and eventually the uterus passed into tetanus.

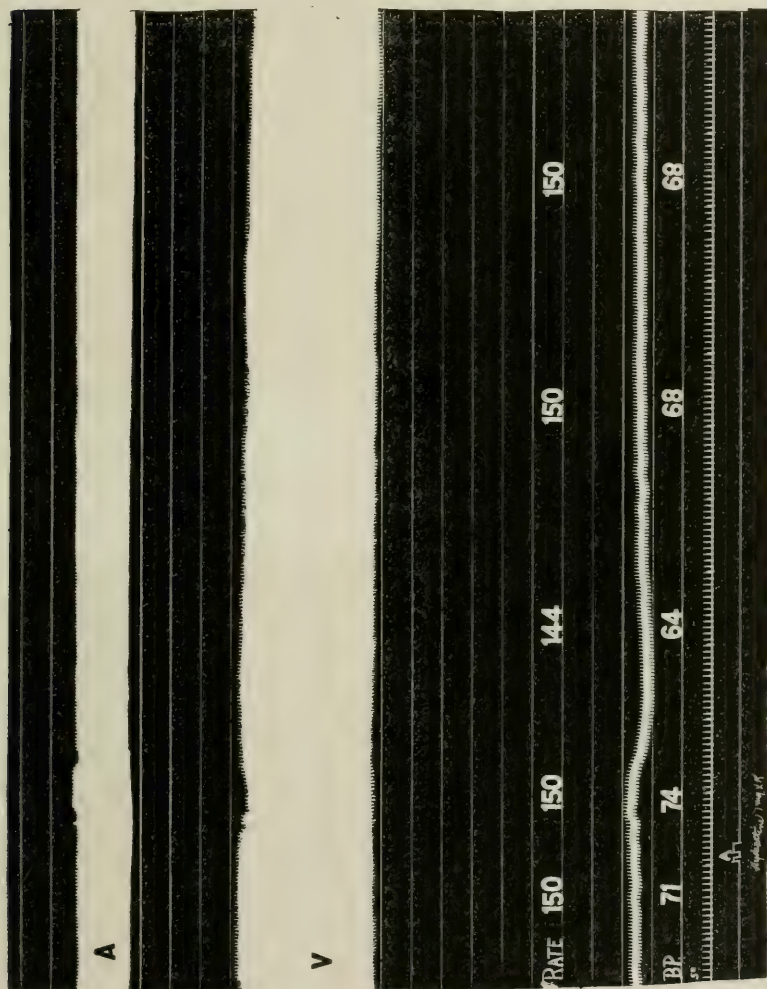


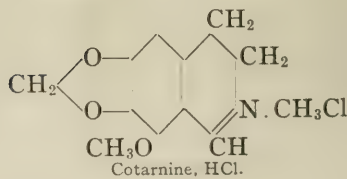
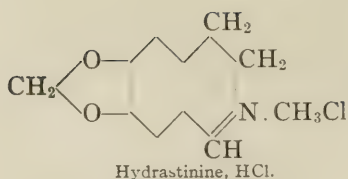
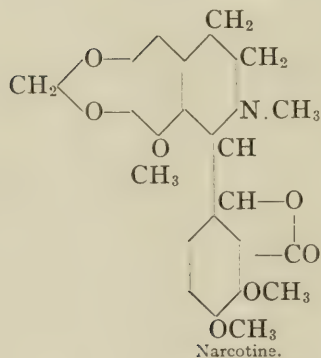
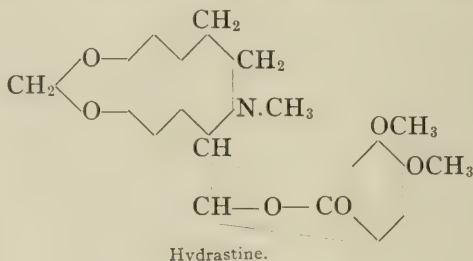
FIG. 16.—Dog. Myocardiogram. A. Hydrastine hydrochlorate, 1 mg. X K.

Therapeutics.—To induce labor, quinine is administered in doses of from 0.5 to 1 gram, and if there is no effect within an hour the dose is repeated. Maurer(21) found that in over 87 per cent. of his cases he could ascribe to quinine a pronounced ecbotic effect within forty minutes of the first dose. Some of the failures which follow

its use are undoubtedly due to lack of absorption of the drug; others can be ascribed to depression of the uterus from excessive doses.

IV. ISO-QUINOLINES.

The iso-quinoline group includes hydrastine, narcotine, and laudanosine, alkaloids characterized by a strychnine-like action on the spinal cord. The toxicity of the group has led to the introduction of a series of derivatives which have not only lost the strychnine-like action on the cord but have become depressants of the central nervous system. These drugs are all closely related chemically and their resemblance is reflected in the pharmacologic action(22).



Hydrastine, the least toxic of the natural iso-quinolines, is the most important constituent of *Hydrastis Canadensis*. On intravenous injection it is said to raise blood pressure. In all my experiments it

has had the opposite effect. Even small doses, such as 1 mg. per kilo, produce, after a momentary and negligible rise, a small but persistent fall (Fig. 16). The heart rate is practically unchanged. Larger doses (2 mg. per kilo) produce a marked and prolonged fall in blood pressure without a preceding rise.

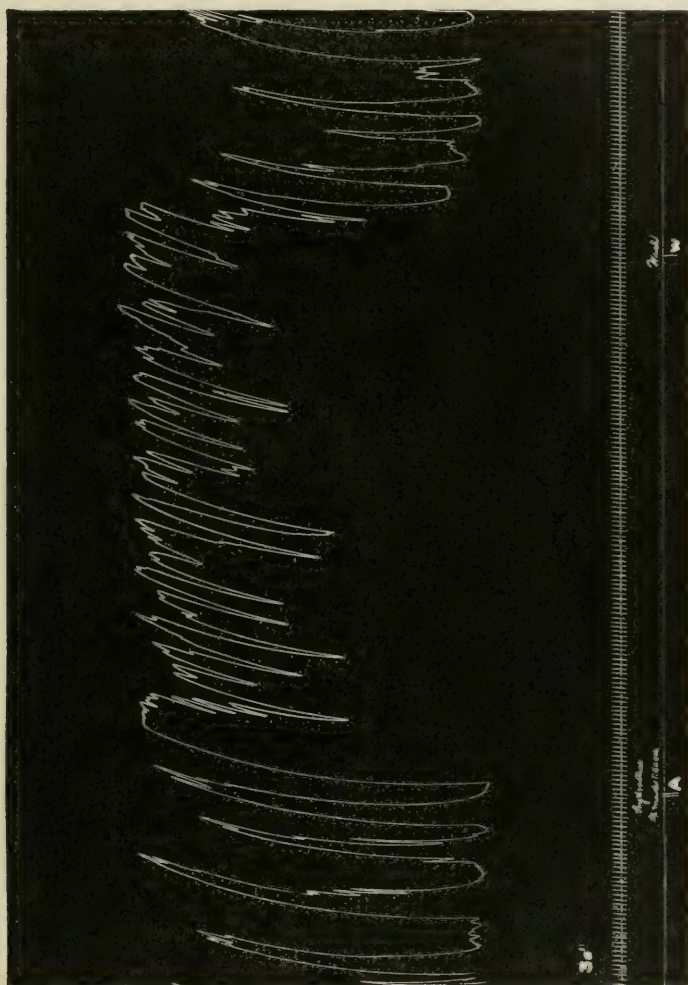


FIG. 17.—Isolated uterus of virgin guinea-pig. Upstroke-contraction. A. Hydrastine hydrochlorate to make 1:50,000. W. Fresh Ringer's solution.

On the isolated uterus (Fig. 17), solutions of 1:50,000 produce a temporary cessation of rhythm in maximum tonus, soon broken by comparatively large relaxations. In more concentrated solution (1:25,000) hydrastine causes, after momentary tetanus, death of the uterus in extreme relaxation.

when the concentration is doubled, and when it is increased twelve-fold (1:7,000) there is an immediate increase in the rate of the contractions and the relaxation becomes very incomplete. On replacing the hydrastinine solution with Ringer's solution, the uterus develops a new rhythm, slow but complete relaxation followed by transitory tetanus. Eventually recovery becomes complete.

Cotarnine is derived from narcotine in the same way that hydrastinine is obtained from hydrastine. The hydrochloride of cotarnine

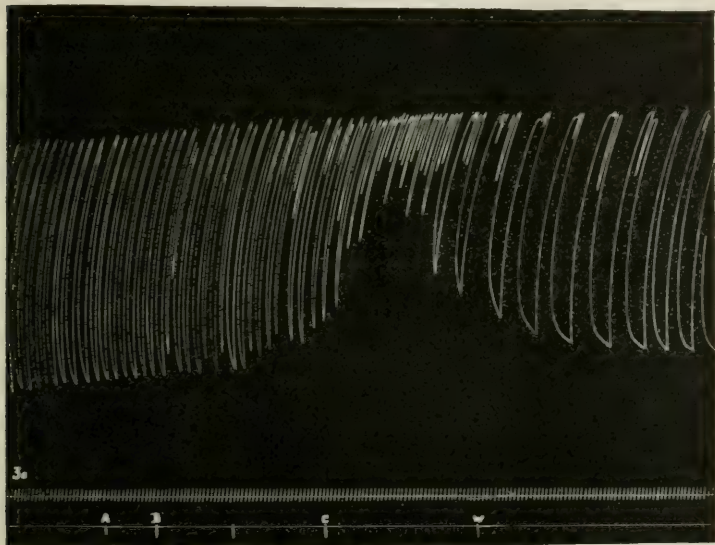


FIG. 19.—Isolated uterus of pregnant guinea-pig. Upstroke-contraction. A. Hydrastinine hydrochlorate to make 1:85,000. B. Hydrastinine hydrochlorate to make 1:28,000. C. Hydrastinine hydrochlorate to make 1:7,000. W. Fresh Ringer's solution.

is marketed under the name of "stypticin," the phthalate as "stypitol."

Injected intravenously in doses of 5 mg. per kilo, cotarnine causes a momentary fall in blood pressure followed by a very small rise (Fig. 20). The heart rate is unchanged.

On the isolated uterus (Figs. 21 and 22), both the alkaloidal salts cause an increase in the rate of contraction and in tonus. On washing away the drugs, the contractions become slow and are characterized by a short tetanus.

The chief indications for the employment of this group of drugs are menorrhagia and metrorrhagia, though it has been suggested that they might be of value in postpartum hemorrhage(23). The

improvement that follows their administration is due not to changes in the circulation nor to a shortening in the coagulation time, but to the action on the uterus. The drugs stimulate the uterine muscle directly, the organ contracts as a whole, the lumen of the intramural vessels is obliterated, and hemorrhage stops.

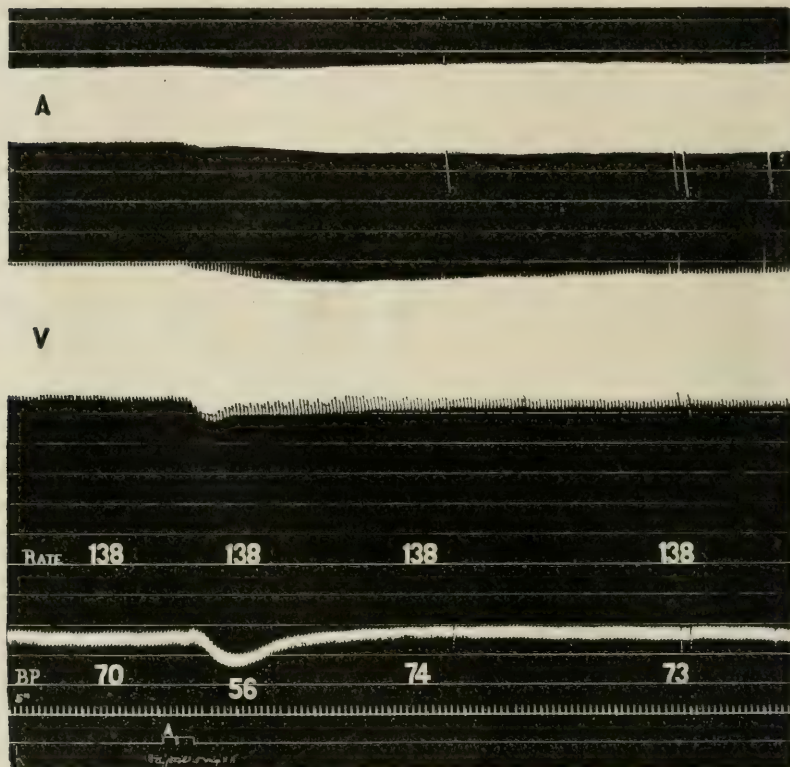


FIG. 20.—Dog. Myocardiogram. A. Styptol, 5 mg. X K.

V. VIBURNUM.

The pharmacology of viburnum has not been fully determined, but in the few experiments performed in this laboratory the addition of small amounts of a fluid extract of viburnum to the Ringer's solution caused a considerable increase in the rate and an improvement in the tonus of the isolated uterus (Fig. 23).

The most important constituent of viburnum is valerianate, and I thought that to this substance might be ascribed the effect on the uterus. Sodium valerianate, however, failed to produce any stimu-

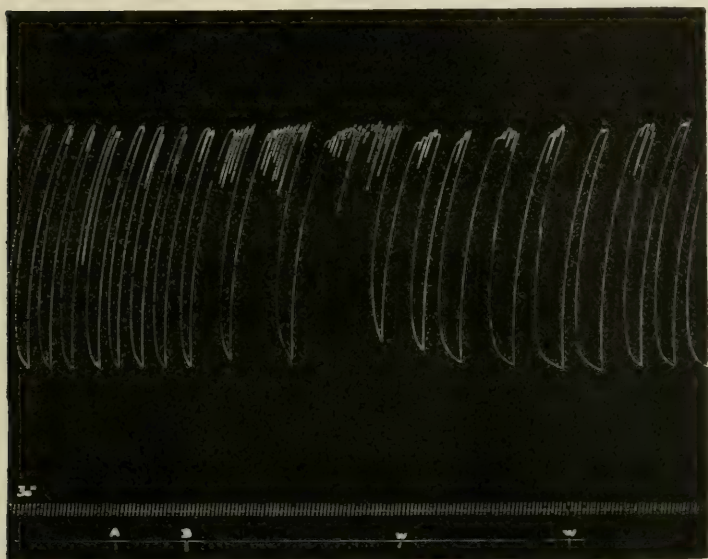


FIG. 21.—Isolated uterus of pregnant guinea-pig. Upstroke-contraction. A. Styptol to make 1:85,000. B. Styptol to make 1:28,000. W. Fresh Ringer's solution.

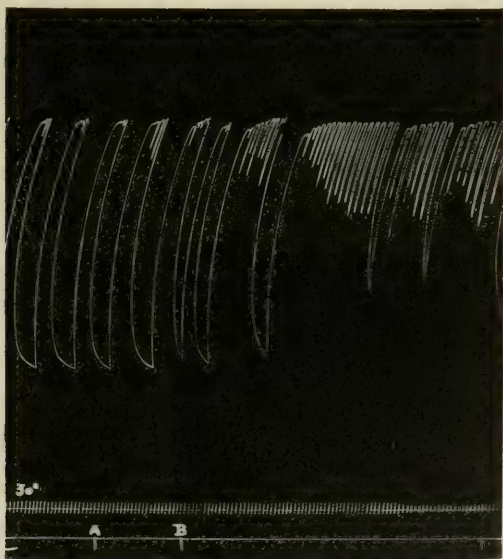


FIG. 22.—Isolated uterus of pregnant guinea-pig. Upstroke-contraction. A. Stypticin to make 1:85,000. B. Stypticin to make 1:28,000.

lation of the uterus, and in high concentrations proved distinctly toxic. The sedative action of viburnum cannot be due, then, to a direct action of the drug on the uterus. Presumably the valerianate quiets the irritable central nervous system and the uterus is affected secondarily. The therapeutic employment of viburnum is apparently purely empiric.

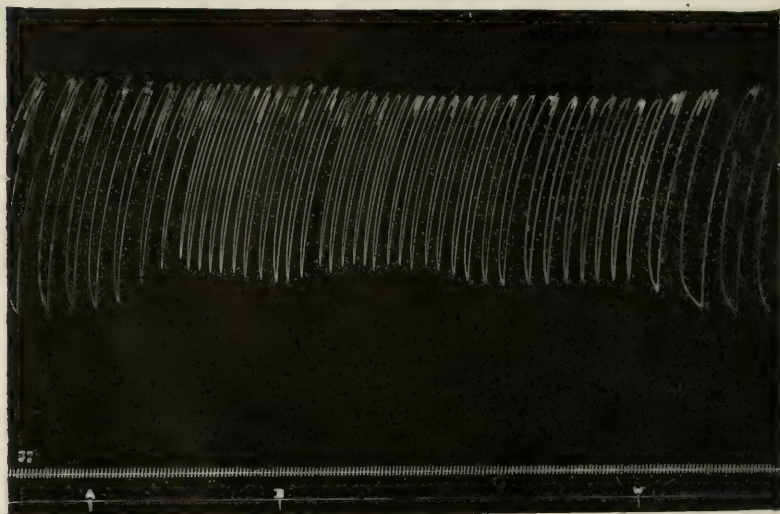


FIG. 23.—Isolated uterus of a pregnant guinea-pig twenty-four hours post-mortem. Upstroke-contraction. A. Fluid extract of Viburnum, 0.1 c.c. (1:900.) B. The same. W. Fresh Ringer's solution.

CHLOROFORM.

Chloroform is so frequently employed in obstetrics that a discussion of its action on the circulation will not be out of place.

The drug, administered by inhalation (between A and B, Fig. 24), causes an immediate and tremendous fall in blood pressure with a remarkable depression of the heart. On replacing the chloroform vapor by pure air (at B, Fig. 24) the recovery is slow and very incomplete. I do not wish to give the impression that this is the effect which follows careful administration of chloroform. Complete anesthesia may be induced without causing a significant depression of the heart,(24) though there is, during the entire anesthesia, a progressive fall in blood pressure. The effect shown above is the one that regularly follows the "pushing" of chloroform, and undoubtedly explains some of the cases of death occurring early in anesthesia.

SUMMARY.

I. Ergot owes its pharmacologic action to several constituents; of these, ergotoxine alone is specific. Beta-imidoazolyethylamine, para-hydroxyphenylethylamine, and the other sympathonimetic amines are products of the putrefaction which occurs during the manufacture of galenical preparations. Each constituent has a distinct pharmacologic action; stimulation of the uterus is char-

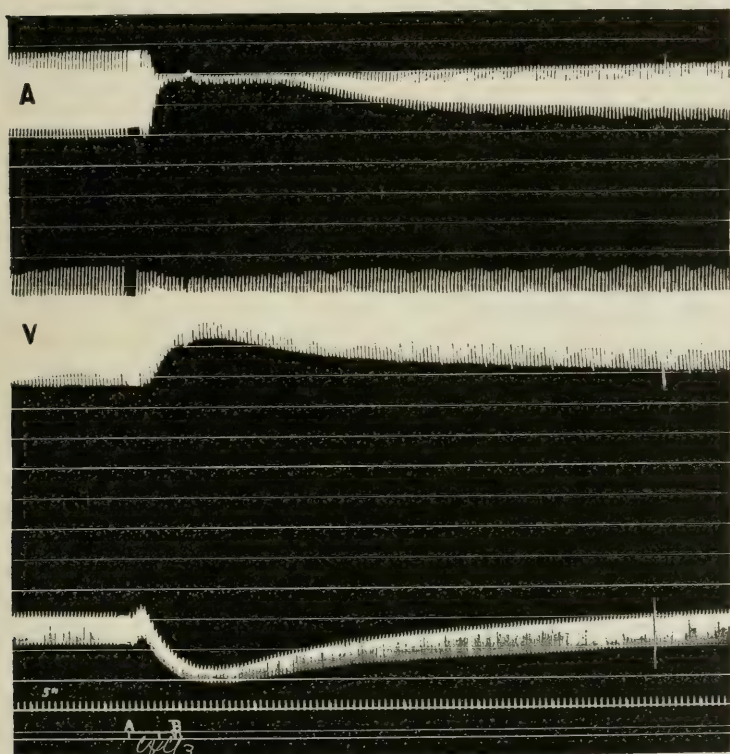


FIG. 24.—Dog. Myocardiogram. Between A and B chloroform by inhalation.

acteristic of them all. In obstetrics at least no single active principle can replace active preparations of whole ergot.

II. Extracts of the posterior lobe of the pituitary gland stimulate all smooth muscle. It has been suggested that the active constituent of the infundibulum is the hormone which initiates normal labor. The extract of the posterior lobe of the pituitary is the most reliable ecbolic which the obstetrician has at his command.

Its promiscuous employment during labor cannot be too strongly condemned.

III. Because of the stimulating action of quinine on the isolated uterus it may be employed to induce or strengthen labor pains.

IV. The improvement that follows the use of the iso-quinolines in menorrhagia and metrorrhagia is due not to changes in the circulation or in coagulation time, but to a direct action on the uterus.

V. Fluid extract of viburnum stimulates the isolated uterus. Its action in dysmenorrhea is therefore not due to an effect upon the uterus but to a depression of the central nervous system.

BIBLIOGRAPHY.

1. Kraft: *Arch. d. Pharm.*, 1906, ccxlv, 336-59.
2. Barger and Carr: *Journ. Chem. Soc.*, 1907, xci, 337-53; *Chem. News*, 1906, xciv, 89.
3. Dale: *Journ. Physiol.*, 1906, xxxiv, 163-206.
4. Barger and Dale: *Biochem. Journ.*, 1907, ii, 240-99.
5. Sharp: *Proc. Roy. Soc. Med.*, 1910-11, iv (Therap. and Pharm. Sect.), 114-150.
6. Kehrler: *Deutsch. Gesellsch. f. Gynäk.*, xiv Cong., 1911, p. 680.
7. Barger and Dale: *Journ. Physiol.*, 1909, xxxviii; *Proc. Physiol. Soc.*, lxxvii.
8. Dale and Dixon: *Ibid.*, 1909-10, xxxix, 25-44.
9. Clark: *Biochem. Journ.*, 1911, v, 236-42.
10. Hoyt: *Am. Journ. Med. Sci.*, 1912, cxliv, 76-81.
11. Barger and Dale: *Journ. Physiol.*, 1910, xl; *Proc. Phys. Soc.*, xxxviii.
12. Wood and Hofer: *Arch. Int. Med.*, 1910, vi, 388-419.
13. Kehrler: *Arch. f. exp. Path. u. Pharm.*, 1907-8, lviii, 366-83.
14. Edmunds and Hale: *Hyg. Lab. Bull.* No. 76, Washington, 1911.
15. Herring: *Quart. Journ. Exp. Physiol.*, 1908, i, 121-157; 161-184; 187-188.
16. Oliver and Schäfer: *Journ. Physiol.*, 1895, xviii, 277-9.
17. Schäfer and Magnus: *Ibid.*, 1901-2, xxvii; *Proc. Physiol. Soc.*, ix.
18. Schäfer: *Quart. Journ. Exp. Physiol.*, 1913, vi, 17.
19. Bell: *Brit. Med. Journ.*, 1909, ii, 1609-13.
20. Quigley: *N. Y. State Journ. Med.*, 1913, xiii, 317-24.
21. Mäurer: *Deutsch. med. Wchnschr.*, 1907, xxxiii Jahrg., 173-6.
22. Laidlaw: *Biochem. Journ.*, 1911, v, 243-73.
23. Kehrler: *Monats. f. Geburt. u. Gynäk.*, 1907, xxvi, 709-27.
24. Knoll: *Sitzungsberichte d. Wien. Akad.*, 1878, lxxviii, Abt. iii, 223-50.

REMARKS ON UTERINE FIBROIDS WITH SPECIAL
REFERENCE TO THEIR RELATION TO TUMORS
OF THE THYROID GLAND.*

BY

CHARLES CLIFFORD BARROWS.

THE presence of fibroid growths having their origin in the uterus has, I may safely say, until very recently been treated with more or less indifference by the general practitioner; and, indeed, many gynecologists have advised ignoring these tumors, unless they were the occasion of alarming bleeding, or produced pressure symptoms of a serious nature.

Should these tumors be discovered when the patient has passed middle life, and especially if she be near the menopause, I believe I am safe in saying that the general advice given is to wait for the menopause, because the tumors will probably undergo a retrograde activity, and diminish in size until they no longer give rise to any trouble, with a disappearance of all the disagreeable symptoms. For ten years or more I have been studying carefully all cases of fibroids that have come into my hands (and the number means many hundreds, so common are these growths) with a view to determining, if possible, the correctness of this notion. In my experience at least 60 per cent. of all uterine fibroids take on, at the menopause, an increased and usually a rapid accession of growth. This is particularly true of interstitial fibroids, or of large, soft myomatous uteri. Certainly, in my experience, that but a comparatively small proportion have undergone atrophic changes of any consequence. I believe the reasons why the "let alone" policy has been so commonly adopted in the management of uterine fibromata are three-fold:

First, because these tumors are not malignant.

Second, because comparatively few practitioners are conversant with the possible dangers to life and health for which these tumors may be responsible.

Third, because the operation for their removal is a surgical procedure of a more or less serious character.

* Read before The Washington Heights Medical Society, June 24, 1913. Free quotations have been made from an article by the author entitled *The Myoma Heart*. *American Journal of Surgery*, May, 1912.

I am free to confess that, except in the case of small growths, situated low in the uterus anteriorly or posteriorly, and thus interfering possibly with the functions of the bladder or rectum, I have seen few cases that presented actual symptoms dependent upon pressure of the growth itself. Hemorrhage, increase in the size of the abdomen, a sense of weight about the pelvis, with more or less disturbance of the functions of the bladder and rectum, are signs and symptoms most commonly noted.

But there are other symptoms which many of these patients complain of more commonly than those mentioned. That is, shortness of breath, palpitation of the heart, precordial distress and irregularity of pulse, and frequent headache. Until 1905 it had been my habit to attribute these symptoms to pressure in a vague sort of way. I am indebted to my friend, Dr. Herman Boldt, for the correct explanation of these symptoms. In a most admirable article published in *The New York Medical Journal*, October 28, 1905, under the caption, "Visceral Degeneration and Uterine Myofibromata," Dr. Boldt concludes that these are cardiac symptoms, and result from a myocardial degeneration dependent on or coincident with the development of the fibroid growth in the uterus.

I had noticed, as doubtless many other gynecologists had, that a large number of patients having uterine fibroids were the subjects of cardiac disease of some sort, but Dr. Boldt was the first one to formulate his views in a clear and concise manner. He tells us that in thirty-seven out of seventy-nine cases, nearly 47 per cent., some circulatory disturbance was noted. Thirty-four of these cases were operated upon by Dr. Boldt, all of them being cases in which cardiac changes had been diagnosed, and five of these women died after operation. Shoemaker, in the *Journal of The American Medical Association*, 1904, pages 1014-16, reports four cases in which uterine fibromata had a detrimental effect upon the heart. And Albert Doran, in his paper on Fibroids and Heart Disease, has had a similar experience (*Journal of Obstetrics and Gynecology of The British Empire*, vol. iii).

George Fleck (*Archiv. of Gynecology*, vol. lxxi) tells us that 133 out of 325 cases of myomata presented pathological cardiac changes, and that in forty-six of these cases there was no atypical bleeding. Twelve of these 325 cases died, three without operation, one of embolism of the pulmonary arteries and two others of myocardial lesions, presenting very decided degeneration changes resembling brown atrophy.

Brown atrophy is anatomically recognized as a lesion frequently

associated with myomata. In his conclusions, Fleck expresses his belief that the affected heart muscle so frequently associated with uterine myomata can be caused only by the action of poisonous substances—believing that these poisonous products originate in the ovaries, which are invariably the subjects of gross changes when associated with uterine myomata.

Many writers, as for instance Leopold, believe that the cardiac degeneration in these cases is due to the loss of blood. Brostin (*Centralblatt f. Gynäkologie*, 1894, page 96) expresses the belief that the cardiac changes are not dependent in any way upon the size of the tumor.

Fehling (*Centralblatt f. Gynäkologie*, vol. xi, page 17) recognizing the presence of cardiac changes in these cases recommends surgical intervention as soon as the symptoms present themselves.

Hofmeier (*Zeitschrift f. Geburtshülfe und Gynäk.*, 1885, page 371), Saenger (*Centralblatt f. Gynäk.*, 1884, page 589). Rose (Ueber die Nothwendigkeit der Myomaoperationen, *Deutsche Zeitschrift für Chirurgie*, vol. xxv), Dohrn (*Zeitschrift f. Geburtshülfe und Gynäk.*, vol. xi, pages 136–139), Landau (*Centralblatt f. Gynäk.*, 1889, page 171), Routh (*Lancet*, May 12, 1900, Trans. of the Obstetrics Society, London), Bertholdi (*Centralblatt f. Gynäk.*, vol. xvii, page 174), Hennig (*Zeitschrift f. Geburts. und Gynäk.*, vol. xxix, page 131) and many others report cases of this character, Landau and Routh expressing the belief that the long-continued use of ergot has a detrimental effect upon the heart. Two cases in which the drug had been used steadily for several months ended fatally, and showed on postmortem dilatation and brown atrophy.

In the 1912, January number (*Surgery, Gynecology and Obstetrics*) Dr. Philip S. Doane, in his inaugural thesis read before the Chicago Gynecological Society in May, 1911, presents a very careful and complete review of this subject up to the time of the reading of his paper.

From his own experience and that furnished him by the experience of other gynecologists, through personal communications and literature presented by him, his conclusions are: That “during the growth of the uterine myoma, a toxic element develops which produces changes in the cardiovascular system, the myocardium is most commonly affected. Just what the toxic element is, is as yet unknown and as far as we can learn no definite study of this subject has been undertaken.” His conclusions have resulted from a personal observation extending over a period of twelve years, and during the past two years a closer study of the cases has been made by him

and a definite conclusion has been reached, viz., that the heart symptoms are not mere coincidences, but are actually due to the myomata. He has found hemorrhage present in the majority of cases, yet as a prime factor it is excluded because the same symptoms appear in myomatous women who give no history of bleeding.

In this connection it is very interesting to note that 90 per cent. of women affected with malignant growths in the uterus suffer from hemorrhage and its resulting anemia. And yet few, if any, of these present cardiovascular symptoms. Attention was called to this fact by Brasin in 1893.

Dr. R. L. Payne, Jr., in the *Journal of the American Medical Association*, Chicago, May 6, 1911, page 1324, presents a number of cases from which he concludes that there is a direct relationship between the development of the uterine myomata and disturbances in the cardiac compensation, and he believes from the result of operative procedures in the cases which he presents that the elimination of the uterine fibroids not only benefits the patient locally, but in some cases results in a more or less dissipation of the cardiovascular symptoms.

One of his cases is particularly interesting. A woman, a worker in a cotton mill, came to him suffering from cyanosis of the lips and finger nails, weak and rapid pulse of the mitral type, a weak apex beat, and a distinct murmur over the mitral area. Two small perineal fibroids, the size of a walnut, were removed, together with the body of the uterus by a supravaginal hysterectomy. There was a rapid relief of all the cardiac symptoms, and at the end of six weeks the patient was back at her work absolutely well, all evidences of symptoms of cardiac distress having disappeared. All of the cases that he reports apparently found prompt relief within a reasonably short time, say from four to six weeks.

A number of writers have quoted cases bearing out the conclusions arrived at by Dr. Doane and myself—that in a large percentage of cases of uterine fibroids:

First, there are present symptoms of cardiovascular disturbances.

Second, that the size of the growth has no relation to the severity of the cardiac disturbances. Symptoms have been apparent while the growth was still small.

Third, in some cases of lost cardiac compensation, associated with fibromyomata, the symptoms are materially benefited by removing the growths.

Fourth, in some cases the cardiac disturbances are of so severe a type as to result in sudden death following operation. He is also

disposed to believe that the cardiac symptoms are due to the products of uterine growth on the heart muscle or heart ganglia—some internal secretion directly the product of uterine hyperplasia.

The general conclusions of such a large number of observers so widely scattered in time and place, cannot fail to carry conviction to the mind of the clinician, even though we do not find these conditions after death. And I believe that the reason why we do not find these conditions postmortem, is because these cardiovascular changes are due to some toxine or some poisonous product developed by or coincident with the development of the uterine growths. This notion is certainly a reasonable one to those who have watched the rapid recovery from cardiovascular signs and symptoms, following myomectomy or hysterectomy for the removal of these growths.

When I first began to study these cases, I believed that I had found the solution of the question in the theory that it depended upon the change in the blood pressure. This idea was first suggested to me by Dr. Studdiford, in a personal communication. The theory that the blood pressure would be increased by the increase in the pipe line, which necessarily would follow the development of vascular tumors of this sort, seemed a very reasonable one. But when I came to investigate this, I found that none of these patients, as a rule, had a high blood pressure, and that the blood pressure was practically not changed by the removal of the tumors themselves, nor by the uterus together with the tumors. So I was forced to abandon this theory.

I shall not attempt to offer you a detailed report of all my cases, but will present four cases, which will serve to illustrate the suggestions I have offered:

CASE I.—The patient is forty-eight years old, the mother of two adult children, who until ten years ago regarded herself as in perfect health, but about that time she began to suffer from profuse menstruation and some dyspnea and cardiac palpitation. Her home was in California, and it was her habit to make several trips across the continent each year. She had been told that high altitudes provoked excessive menstruation, as well as shortness of breath, and palpitation of the heart, and she came to me to find out whether it would be best for her to remain at or near the sea-level. This was about the time that I had begun to be convinced of the relationship between uterine fibroids and cardiac disturbances. And, in addition to the ordinary physical, I suggested that a vaginal examination be made. This revealed a hard intramural fibroid the size of a large orange, occupying the upper anterior portion of the uterine body. This had not, nor has it until now interfered

in any way with the functions of the bladder or intestinal tract. The patient was not aware of anything unusual about her pelvic organs. Soon after this, some six years ago, she came to live in New York, and has been under my care since then. At irregular intervals, two or three times a year, I am sent for hurriedly because my patient is suffering from an attack of faintness and dyspnea. These attacks are apparently provoked by unusual excitement or fatigue, and have no relationship or connection with the menstrual period. The menstrual flow since her residence in New York has been normal in quantity and periods. I may say that the patient's summers are spent on a commodious steam yacht, cruising in eastern waters, so that she rarely goes above sea-level. Her residence is less than a city block's distance from my house, and I have been able to reach her promptly when sent for. At these times she presents all signs and symptoms of cardiac dilatation, and on several occasions I have been fearful that she would not survive. She shows cyanosis of the lips and finger nails, weak, rapid pulse, weak apex beat, a soft murmur over the mitral area, great anxiety and apprehension of some serious result and marked dyspnea. This condition responds usually to cardiac stimulants and rest in bed. And the patient in the course of a few days is able to resume her ordinary life, which is one of comfort and ease.

I have not been able to induce this patient to submit to operative interference, though I have explained the matter to her fully.

CASE II is one of extreme interest. This patient, a woman of forty-eight years, an actress by profession, was referred to me by Dr. J. Clifton Edgar, she having been sent to him by Dr. Doane, of Chicago. In a letter which Dr. Doane sends to Dr. Edgar, he says: "This tumor has apparently taken on a rapid growth during the last six months, and she was to have undergone an operation by me for its removal on the 20th of this month (December, 1911). She is obliged to go East, and I have given her your name. You will find her possessed of an old myocarditis, which I believe is secondary to the uterine growth."

I kept this patient under observation for ten days prior to operation. When I first saw her, her pulse was 100, a rhythmical skipping every fourth or fifth beat. Her heart sounds were rather feeble, with a faint systolic murmur over the mitral area. The patient told me that on numerous occasions she had suffered from fainting attacks, preceded by shortness of breath and precordial pain. She said that she usually responded to stimulants, such as aromatic spirits of ammonia or brandy, but for several days after the attack she would feel weak and depressed. She was put on small doses of strophanthus, together with bromide of strontium and strychnine. At the time of her operation, which she approached with a good deal of nervousness and apprehension, her heart beat was regular and rhythmical, 84 to the minute; the rate of her respiration 20 to the minute, and free from distress. The anesthetic was given by Dr. Bennett, and he reported that she took it without any unusual disturbances. I did a supravaginal hysterectomy, and

removed the uterus, together with a hard fibroid, about the size of a mandarin orange. The operation was done without difficulty, occupying probably half an hour. The patient was put to bed in an apparently good condition, at 11.40 A. M. on December 31, with a pulse of 128, and her respiration 24. She recovered promptly from the anesthetic, and was fairly comfortable until the following morning, when she complained of some slight dyspnea and lack of sleep. At 7.45 A. M. January 1, she was given a quarter of a grain of morphine. Her pulse then was 112, temperature 100, respiration 20. Passed urine and a considerable amount of flatus by tube per rectum. She had a good night, and was reported as quite comfortable on the morning of the second of January, the second day after the operation. Her bowels moved satisfactorily in response to a dose of citrate of magnesia; pulse 108, temperature 100, respiration 20. On the evening of that day her temperature was 99, pulse 106, respiration 28. At 3 o'clock on the following morning, the third day after the operation, I was called and found her with a temperature of 99.6, rapid respiration, great dyspnea, pulse imperceptible at the wrist, and the sounds of the heart extremely weak; the first sound being practically obliterated. This condition had come on apparently suddenly; the patient having been as comfortable as patients usually are following hysterectomy, up to the time that I was called at 3 o'clock in the morning. The patient was very restless, and complained of great dyspnea. There was some mechanical emesis, but no nausea, mouthfuls of colorless fluid coming up from time to time. The abdomen was not particularly distended, and the bowels had moved and flatus had been expelled during the night. Every effort was made to stimulate the heart; Dr. Edgar, Dr. Bailey, Dr. Rice and myself, all or some of us being in constant attendance. But in spite of these efforts the patient steadily failed, and 4.30 in the afternoon died.

This case, it seems to me, was a pure cardiac case, her death being due to failure of the heart muscle to do its work. There was no sepsis, no evidence of hemorrhage, no obstruction to the action of the bowels, no dilatation of the stomach and no symptoms of any kind which would account for her fatal ending, except those dependent upon her cardiac condition. I regretted exceedingly that no autopsy could be had in this case.

In striking contrast with these cases are such cases as the following:

CASE III.—Mrs. S., forty-five years old, a mother of four children, a resident of Staten Island, was referred to me by Dr. Sprague one year ago. She had had some disturbance of her menstruation, and was suffering from dyspnea, palpitation of the heart, inability to exercise because of these conditions, slight cyanosis of her hands and lips, and a general sense of weakness and fatigue on the slightest exertion. A vaginal examination revealed a uterus filled with multiple growths, the whole organ with these growths being about the size of a cocoanut. Dr. Sprague had had this patient under observation for several years, and was cognizant of the presence of these uterine growths. He tells me that they had not increased

very much during the time that he had observed them, that is to say, for two or three years. Her menorrhagia was not of a serious type, and she did not present the appearance of an anemic person. An examination of her blood showed a practically normal condition. Examination of her heart revealed a rapid pulse rate, a rhythmical heart beat and increase in the area of cardiac dullness and a feeble apex beat. The heart sounds were weak, and there was a soft systolic murmur. I operated on this patient on February 10, 1911, removing the uterus with its appendages by a supravaginal hysterectomy. She made a prompt recovery, and at the time of her departure from the hospital her cardiac conditions had materially improved, that is, within three weeks. Frequent reports from her, and from Dr. Sprague, have told me that since that time her general condition, as well as her cardiac condition, has steadily improved, and that now no evidence of any cardiac disturbance can be discovered. She walks up the Staten Island hills or down them with comfort and with pleasure, with no dyspnea, and no palpitation. In a letter that I have just received from her, she expresses her great gratitude at my having restored her to youth and to health.

CASE IV.—Mrs. H., sixty-two years old, mother of several children, was referred to me by Dr. A. R. Stern. Some years before she consulted me, she had been curetted for excessive menstruation.

For several years she had been suffering from what is called asthma, and could take practically no exercise, because of the shortness of breath and palpitation of the heart—even walking up and down stairs being a difficult problem.

Dr. Stern, in a general examination, discovered a large abdominal tumor, which he took to be a fibroid. She was at the country place of one of her daughters at Larchmont, and it was there that I saw her with Dr. Stern. I brought her to New York in an ambulance, and on June 1, 1911, removed, by panhysterectomy, the uterus, the site of a 6-pound intramural fibroid. She made a satisfactory recovery, and at the end of three weeks returned to Larchmont. Her asthmatic symptoms rapidly disappeared, and she is now free from any cardiovascular disturbance of any kind. She goes up and down stairs easily, takes walks, sleeps well, and is as active as any woman of her years.

I could quote a great many cases with practically the same history. The relief from what are commonly called "the pressure symptoms," and what are really cardiovascular disturbances, are so prompt that I am compelled to believe that they must depend upon some toxine or some poisonous product of some sort in the blood, developed by or coincident with the development of the uterine fibroid.

The cardiovascular disturbances in these cases of fibroma uteri are so similar to those occurring in cases of exophthalmic goiter that I determined, in any case where these conditions existed in the same patient, to remove the fibroids, with the hope of curing the exophthalmic goiter. About a year ago such a case was referred to

me by Dr. Thomas W. Salmon, of the National Committee for Mental Hygiene.

Dr. Smith says:

"I used to attend Mrs. S. in 1889 and 1900. At that time she was a healthy young woman, with no cardiac trouble, and no enlargement of the thyroid gland. Five years later I saw her in New York. At that time she had the fibroid growths and beginning prolapse. Her general condition was good—there was no enlargement of the thyroid nor disturbance of the circulatory organs. Her nutrition was fair, and she was not suffering from nervousness. The next time I saw her was the day I brought her to your office. At that time, as you know, she had marked dyspnea—enlargement of both lobes of the thyroid, pulsating veins of the neck and upper extremity. Systolic murmur over the aortic area, and a systolic mitral murmur transmitted to the axilla.

"The heart was much enlarged. There was also a marked bruit in the carotids. She had a fine tremor of the hands—fingers and lips and the knee and wrist reflexes were exaggerated."

Dr. Harlow Brooks saw her, and reported a blood pressure of 170 mm. systolic, and 90 mm. Hg. diastolic. His diagnosis was exophthalmic goiter, with secondary myocarditis.

This patient was admitted to my service at Bellevue Hospital on November 9, 1912. She complained of the symptoms and presented the signs just related in Dr. Salmon's letter. Her pulse rate was about 150, absolutely arrhythmical and easily disturbed. She was in such great distress that she was anxious to have anything done that might hold out a chance for relief, even after the gravity of the operation, and the fact that it was purely experimental, was explained to her.

I operated on her before the Congress of Clinical Surgeons on November 12, removing the uterus with a group of subserous and interstitial fibroids, weighing 3 pounds. The operation was easily and rapidly accomplished, with but little shock to the patient. On the following day the patient was much more comfortable than before the operation—her pulse having dropped down to 120 per minute, and being fairly regular. The house staff were satisfied that her exophthalmus, which had been very prominent before the operation, was less marked.

She continued to improve, and on the twenty-seventh day of December, less than two months after the operation, Dr. Cary Eggleston took a pulse tracing for me, and Dr. B. M. Howard made a physical examination by auscultation. These gentlemen were both from the Cornell University Physiological Laboratory.

Dr. Eggleston reported:

"Two tracings show no abnormality save increased rate. The rhythm is perfectly regular, and the auricle precedes the ventricle by the normal time interval. It would seem that she has a toxic tachycardia, probably the result of thyroid intoxication."

Dr. Howard reported:

"Valve areas examined by auscultation—no abnormality detected."

"The patient's goiter had diminished, so that it was hardly noticeable—her exophthalmos had disappeared, and she expressed herself as being free from dyspnea or discomfort of any kind. Her pulse rate was 86, and regular. She returned to her home in Rhode Island, Jan 1, 1913. In March, 1913, I received a letter from her telling me that she was well and strong, was taking care of several children, and doing her own work. She reported that her neck measured 12 inches in its thickest part.

On March 25, Dr. Salmon wrote me saying: "Except for a slight prolapse of the anterior vaginal wall, our patient is well and strong. It is needless for me to say that I have appreciated very much all you did for Mrs. S., and I congratulate you on the splendid outcome, in what seemed to be a pretty hopeless situation."

Surely such a case as this should set us thinking. Time does not permit us to discuss in detail all the conditions dependent upon the presence of uterine fibroids, but I do want to speak briefly, in conclusion, about uterine fibroids and pregnancy. It is a self-evident fact that these tumors are in many instances responsible for sterility in the female—either by mechanical obstruction of the uterine canal or by disease of the endometrium, which is their constant accompaniment. In two cases of persistent sterility in young married women with fibroids, I have opened the abdomen, and removed, by myomectomy, in the first case twenty-three small tumors, and in the second case, seven—the tumors in each case ranging from the size of a marble to that of a small pea. In the first case, referred to me by the late Dr. Hitchcock of Harlem, two children have been born. The second case, referred to me by Dr. Polk, in December last, is now pregnant.

Of even more interest is the presence of uterine fibroids during pregnancy. We all know how prone these cases are to abort, and how commonly, after abortion or labor at term, they are the subject of septic or sapremic infection of some kind, how many of them suffer from postpartum hemorrhages, and how difficult these hemorrhages are to control, because of the irregular and imperfect contraction of the fibroid uterus.

I have operated five times on pregnant women, the subjects of uterine fibroids—each case going to term without interruption. Two of these cases are of sufficient interest to report to you.

The first case was referred to me by Dr. Chas. Knight of Peekskill. The woman was four months pregnant, and her abdomen was filled with an enormous tumor, twice the size of a uterus at term. I opened her abdomen, and removed a fibroid springing from the

anterior wall of the uterus, with a base more than five inches in diameter, and occupying the entire uterine wall. The fetus could be seen in its envelope, but the membranes were unruptured. The tumor weighed 9 pounds. The woman made an excellent recovery, carried that child safely to term, and has since borne another child without difficulty of any kind.

The second case I saw some months ago in consultation with Dr. Emberson of New Rochelle.

The patient, a fine type of young woman was about seven months advanced in her first pregnancy; while walking she was seized with great pain and tenderness over the right lower quadrant of the uterus. At the same time she was beginning to have rhythmical uterine contractile pains. Examination revealed the presence of a tender mass, the size of a lemon on the right upper anterior face of the uterus. Vaginal examination disclosed an os dilated to the size of a half dollar, with membranes intact, and the fetal head presenting. I believed the tumor to be a fibroid, possibly pedunculated, in which a twisting of the pedicle or some other disturbance had resulted in an interference with its circulation. It seemed as if the uterus was about to empty itself.

On opening the abdomen, which was done at once, my diagnosis was verified, and the tumor, a pedunculated fibroid, was easily removed. The uterine contractile pains ceased promptly, and the patient went to term, and was safely delivered by Dr. Emberson.

About the treatment of uterine fibroids:

I have tried faithfully every form of electrical treatment, from the electrolysis of twenty years ago to the *x*-ray of to-day, and every variety of internal therapy, mineral, vegetable and animal, and I am quite satisfied that the only correct treatment for these growths is to remove them.

Indeed, this paper is a plea for their removal, and for their early removal, before such disastrous results as I have tried to picture to you have developed.

The mortality of hysterectomy and myomectomy in the hands of competent gynecologists is practically nil, certainly less than one-half of 1 per cent.

63 EAST FIFTY-SIXTH STREET.

AN ANALYTICAL STUDY OF TWO HUNDRED CASES OF PELVIC INFLAMMATORY DISEASE.*

BY

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PELVIC inflammatory disease is one of the conditions which the general practitioner as well as the gynecologist is frequently called upon to treat. Because of this fact a discussion of the subject is always of interest and value.

As a basis for this paper, I have studied the histories of the last 200 patients who have been treated surgically during the last four years in the gynecologic department of the University Hospital for inflammation of the pelvic structures.

Pelvic inflammatory disease, broadly speaking, is any infection of the uterus, tubes, ovaries, pelvic peritoneum, or pelvic cellular tissues. So commonly are the Fallopian tubes the seat of the active process that salpingitis, in the acute or chronic stages, is often spoken of as pelvic inflammatory disease, but involvement of the tubes alone is very uncommon.

Etiology.—The bacteriology of pelvic infections has been well worked out. Of the organisms causing this disease, the gonococcus is most often the offender and is followed closely by the streptococcus. Other organisms, as the staphylococcus, colon bacillus, bacillus of tuberculosis and pneumococcus do produce pathologic conditions in the pelvis. The following table gives the results obtained from a series of 200 cases.

TABLE I.—CAUSE OF INFECTION.

	Number of patients	Percentage
Gonorrhea.....	76	38
Sepsis following abortion.....	36	18
Sepsis following confinement.....	51	25.5
Tuberculosis.....	21	10.5
Questionable origin.....	16	8
Total.....	200	100.0

* Read before the Tuscola County Medical Society, May 18, 1913, and the Clinical Society of the University of Michigan, July 16, 1913.

It is evident that gonorrhea leads the list of etiologic factors, showing 38 per cent. If it is true that fully one-quarter of the cases of sepsis following abortion and full-term labors, can be traced to a former gonorrheal infection, the percentage in this table would be raised to 48+ per cent. If to this we add the greater part of the 8 per cent. of questionable origin, gonorrhea would probably be properly credited.

Sepsis following criminal and accidental abortion, also after confinement accounts for many of the most virulent and fatal cases of pelvic inflammatory disease.

It is remarkable that so many cases of pelvic tuberculosis appear in this series and probably 10.5 per cent. would be relatively too high if the cases had not been collected from an institutional clinic.

Pathology.—Acute pelvic inflammation gives various pathologic pictures. Following an endometritis, if the virulency of the invading organism is slight, the tubes may show congestion and some thickening of their walls which are infiltrated with leukocytes. Some of the fimbriæ may be bound together. More often the fimbriated extremities of the tube become closed off due to a greater inflammatory reaction. The tube curves itself about the ovary or attaches itself to the broad ligament. There may or may not be exudate poured out. Where a purulent collection forms in the tubes, these structures are soon fastened to adjacent organs by plastic exudate. Nature kindly sends down the omentum and intestines to wall off the pelvic from the general peritoneal cavity. In this way the posterior culdesac comes to contain one or two large abscesses. At times the ovaries contain purulent collections. In highly virulent streptococcus cases a general peritonitis sometimes develops, or the organism traveling out through the lymphatics from the uterus, involve the cellular structures.

Some pathologists attempt to describe various form of chronic pelvic inflammatory disease, but the truth of the matter is that chronic inflammatory disease is a residual condition following an acute one. An exception to this is found in the tuberculous type where the onset is usually insidious. However, because the process is old it must not be thought that the pathology is harmless. Very often chronic pus tubes, fibroid, nodular tubes, chronic ovarian abscess, etc., are harboring virulent germs and when these are liberated at operation, peritonitis rapidly develops. Dense bands of adhesions are the most common signs of chronic inflammatory infection.

Table II shows the number of acute and chronic cases and the amount of involvement of the pelvic structure.

TABLE II.—INVOLVEMENT OF ORGANS.

Organs	Number of cases
Uterus.....	3
Uterus, tubes and ovaries.....	153
Both tubes and ovaries.....	10
Right tube and ovary.....	10
Left tube and ovary.....	19
Left tube.....	1
Left ovary.....	2
Both ovaries.....	1
Pelvic cellulitis.....	1
Total.....	200

Tables III, IV and V show the structures involved in the various types of infection.

TABLE III.—INVOLVEMENT IN GONORRHEAL CASES.

Organs	Number of cases
Uterus.....	2
Uterus, tubes and ovaries.....	58
Both tubes and ovaries.....	4
Right tube and ovary.....	6
Left tube and ovary.....	6
Total.....	76

TABLE IV.—INVOLVEMENT IN PUERPERAL AND ABORTION CASES.

Organs	Number of cases
Uterus, tubes and ovaries.....	59
Both tubes and ovaries.....	6
Right tube and ovary.....	4
Left tube and ovary.....	13
Left tube.....	1
Left ovary.....	2
Both ovaries.....	1
Pelvic cellulitis.....	1
Total.....	87

TABLE V.—INVOLVEMENT IN TUBERCULOUS CASES.

Organs	Number of cases
Uterus, tubes and ovaries.....	21
Involvement in cases of questionable origin	
Uterus.....	1
Uterus, tubes and ovaries.....	15
Total.....	16

In 76.5 per cent. of the cases all of the generative organs were involved. The left appendages were oftener involved than the right.

Pelvic inflammatory disease shows a definite relation to the periods of greatest sexual activity and child bearing. This is emphasized in Table VI.

TABLE VI.—AGE.

Years	Number
10-15	1
15-20	5
20-25	39
25-30	25
30-35	42
35-40	37
40-45	26
45-50	18
50-55	6
55-60	1
Total	200

A study of the type of infection in relation to the ages of the patients give the following figures:

TABLE VII.—AGE AND TYPE OF INFECTION.

Age	Gonorrhea	Abortion	Puerperal sepsis	Tuberculosis
10-15	0	0	0	1
15-20	8	2	5	2
20-25	28	18	14	7
25-30	12	14	13	3
30-35	8	7	7	4
35-40	11	4	7	2
40-45	3	1	5	1
45-50	5	1	0	1
50-55	1	0	0	0

All types of pelvic inflammatory disease are most frequent between the ages of twenty and thirty years, while after forty years the disease is relatively infrequent. The youngest patient was thirteen years of age and had a tuberculous infection. The oldest patient was fifty years of age and had an acute gonorrheal infection of one month's duration.

In the cases studied, 182 of the patients were married and suffered from gonorrhea, sepsis, or tuberculosis. The majority of these patients contracted gonorrhea from their husbands, many of the

abortions were criminal and were performed by the patients. Tuberculous infections followed abortion or child bearing in several cases.

There were eighteen single patients. Of this number eleven had gonorrhea and four had tuberculosis.

The question of sterility following a pelvic infection is most interesting. It is well known that gonorrhea and tuberculosis usually involve the tubes causing them to be sealed off, while a streptococcus infection involves the parametrium and peritoneum. The number of children and some of the causes of sterility are shown in the table which follows:

TABLE VIII.—MARRIED WOMEN.

Children	Number of children
para-o	45
para-i	45
para-ii	38
para-iii	26
para-iv	17
para-v	4
para-vi	3
para-vii	3
para-viii	1
Total	182

Sterility due to gonorrhea.....	36 cases
Sterility due to tuberculosis.....	7 cases
Sterility due to questionable infection.....	2 cases
	<hr/> 45 cases

The general condition of patients suffering from pelvic inflammatory disease is of great importance because the greatest good comes from operative procedures and surgical risks are of two kinds, good and bad. Certainly the majority of the patients who suffer from either acute or chronic pelvic infection, are poor risks unless handled properly.

Nine patients out of 100 showed a normal blood picture; the remaining eighty-one patients had secondary anemia. The most com-

mon conditions found were, anemia, hemic heart murmurs, heart lesions, myocarditis, nephritis and gastrointestinal disturbances.

Symptoms.—The symptoms and signs of acute pelvic inflammatory disease are as follows: Pain in one or both lower quadrants of the abdomen, fever ranging from 100 to 105 degrees, profuse leukorrheal discharge in the gonorrheal cases but sometimes in septic cases the discharge is only moderate or absent, leukocytosis, abdominal tenderness and muscle rigidity, pains increased by movement; on vaginal examination, marked tenderness of the pelvic structures, inability to outline the organs because of spasm or exudate, at times distinct masses in the lateral pelvic regions or culdesac, fluctuation of large abscesses.

In chronic conditions the patient has exacerbations of the old trouble from time to time. Often these attacks precede the menses and dysmenorrhea is common. Often the symptoms of retrodisplacement are given as frontal headache, lumbar backache, leukorrhea, constipation, etc. Examination often reveals a retroverted, tender, adherent uterus, but when the uterus is forward, there is thickening in the tubal regions and the ovaries are unusually sensitive and immobile. This last sign is by far the most important.

Diagnosis.—The diagnosis of pelvic inflammatory disease is usually easy to make because the history is helpful. If a young woman marries and a few weeks or months later comes for treatment of a profuse leukorrhea, smarting and burning upon urination, vulvovaginal abscess, abdominal pain and tenderness, gonorrhea is usually a good diagnosis. If following an abortion or confinement and the patient has chills, fever, prolonged flow of bloody lochia, a large tender uterus, feeble pulse, marked anemia, she probably has a mild sepsis. Virulent streptococcus infection is not difficult to diagnose, because of the intense symptoms. Beside a family history and pulmonary involvement the following points outlined by Kelly are useful in the diagnosis of tuberculous disease of the pelvis:

First, extensive pulmonary disease associated with pelvic inflammatory masses.

Second, where a persistent uterine discharge or uterine curettings are found to contain tubercle bacilli.

Third, where there is pelvic inflammatory disease associated with irregular ill-defined masses with fluctuation in the lower abdomen, and the latter are noted at subsequent examinations to have changed their relation.

The examination of smears from the cervix and a diagnostic curettage are very useful measures. I wish to emphasize the im-

portance of ether examinations where the patient is too tender to allow a careful bimanual examination. Many supposed inflammatory cases have been found to be cases of hysteria and neurasthenia.

Treatment.—Pelvic infection, like other infections, requires general measures, such as absolute rest, stimulation of the emunctories locally cold applications give relief. In the acute stages, hot, long-continued vaginal douches hasten the softening of exudate, lessen congestion and relieve pain. When a definite mass can be outlined and pus is undoubtedly present, a posterior colpotomy gives the best results. The operation is simple and has only a few dangers attending. These are tears of the rectum, damage to the uterine arteries or the ureters. These can be avoided by stripping back the posterior vaginal mucosa from the cervix and with it any rectocele which might be present. Always work in the median line and against the cervix. In this way the vessels and ureters can be passed without harm. After the finger or blunt scissor is past the danger zone, the masses can be punctured laterally. The value of this operation is great. Many patients return for a radical removal of the involved organs several months after the posterior colpotomy has been done. By that time the inflammation has lost its virulency and the abdominal operation is without incident. However, many women are so greatly relieved that the laparotomy is never performed.

In the chronic cases a laparotomy is necessary to obtain a cure. The objects of the abdominal operations are: first, to release adhesions; second, to remove diseased organs, third, to restore the organs which can be saved to as near as normal condition as possible. No one branch of operative gynecology is so difficult as radical operations in inflammatory cases. A surgeon who intends to do a hysterectomy at the beginning of an operation, may find himself anastomosing intestines, repairing the bladder, transplanting the ureter and various other things before the operation is completed. Not only this, but foci containing virulent foci of organism may be hidden in the pelvic débris and a splendid operation may be followed by peritonitis and death.

The nature of the operations performed on the 200 cases studied is recorded in the following:

TABLE IX.—OPERATIONS.

Operation	Number
Panhysterectomy and bilateral salpingo-oophrectomy	38
Supravaginal hysterectomy and bilateral salpingo-oophrectomy . . .	54
Posterior colpotomy	38
Laparotomy, freeing adhesions	22
Bilateral salpingo-oophrectomy	4
Right salpingo-oophrectomy	17
Left salpingo-oophrectomy	19
Left salpingectomy	2
Right oophrectomy	1
Left oophrectomy	5
Total	200

It was possible to save all of the pelvic organs in sixty cases. In forty-eight cases some of the organs were saved, in most instances the ovaries. Ninety-two patients had all the internal generative organs removed.

Complications.—Suppuration of the abdominal wounds is a frequent complication and is due to contamination in removing septic organs and to the poor resistance of chronic septic patients. Tears in the intestines occur in freeing adhesions and are especially liable to occur in tuberculous infections. Phlebitis sometimes occurs in panhysterectomies without infection but is more likely to occur in septic cases. Fistulæ are formed in separating adherent structures and in sloughing following trauma. Cases have been reported where adherent gauze used for drainage caused fistulæ. I have listed the complication found.

TABLE X.—COMPLICATIONS.

Suppurating abdominal wound	19
Tears in the intestines	3
Infected hematoma	1
Phlebitis	1
Urinary fistula	1
Rectovaginal fistula	1

Results.—The results of operative treatment for pelvic inflammatory disease are most on the whole gratifying, if it be con-

sidered that the operative work was not performed by the head of the department alone, but by his three assistants as well.

TABULATION OF THE RESULTS IN THE SERIES SHOWS.

Patients cured.....	149 or 74.5 per cent.
Patients improved	38 or 19 per cent.
Patients not improved.....	2 or 1 per cent.
Patients died.....	11 or 5.5 per cent.

Total	100.0 per cent.
-------	-----------------

The causes of death were:

Peritonitis.....	5 patients
Shock.....	2 patients
Miliary tuberculosis.....	1 patient
Postoperative hemorrhage.....	1 patient
Acidosis.....	1 patient
Acute intestinal obstruction	1 patient
	—
	11 patients

The results of this analytical study would warrant the following brief conclusions:

First, pelvic inflammatory disease is most frequently caused by a gonorrheal infection. Sepsis following abortion and confinement is an important causal factor. Tuberculosis is not an uncommon agent in pelvic infections.

Second, pelvic inflammatory disease is greatly increased during the years of greatest sexual activity.

Third, gonorrhea is a most important factor in producing sterility.

Fourth, pelvic inflammatory disease is often the cause of secondary anemias in women.

Fifth, streptococcus infections often localize in the parametrial tissues. Gonococcus infections select the tubes.

Sixth, posterior colpotomy gives excellent results in acute cases.

Seventh, laparotomy months after a colpotomy or when the condition is chronic holds out the greatest hope of a cure.

A CONTRIBUTION TO THE SEROLOGY OF PREGNANCY AND CANCER.¹

BY

HENRY SCHWARZ,

St. Louis.

(With One Cut.)

ABDERHALDEN's observations and discoveries, regarding the protective ferments and the applicability of his biological methods to the diagnosis and study of many pathological conditions, are receiving worldwide attention. The obstetrician and gynecologist is especially interested in this work, because it is in his particular field that these biological tests have found the first practical application.

It has been proved by the observations of many investigators that in diseased conditions of the various organs of the body, likewise in malignant disease and also during pregnancy, the blood is contaminated by cell-albumin from the affected organs, the malignant cells or the chorionic villi, and that the organism responds to the entrance of this blood-foreign material by the mobilization of ferments which effect the intravascular digestion of these proteins. It has also been proved that such ferments are not present in the blood of normal individuals.

Before considering the question whether or not these ferments are strictly specific, it may be of advantage to contemplate the observations on which Abderhalden's work is based, and to follow the evolution of his work to the point at which he submitted his findings to the clinicians and placed his methods in their hands, asking them to explore the new field which he has discovered. In substance these observations are as follows:

Each individual cell of the animal organism leads, in a great measure, the life of a unicellular animal; it consumes food and oxygen and it eliminates the waste products of its metabolism.

The blood is the great purveyor to the cells; it delivers at their door the oxygen and the food which they need to sustain life, and it carries away the products which they throw out.

The protein material which the cells need for the building up and

¹ Read before the Twenty-sixth Annual Meeting of the American Association of Obstetricians and Gynecologists at Providence, Rhode Island, September 16-18, 1913.

the repair of their protoplasm is carried to them in the form of the simple building stones of the albumin molecule, the amino-acids.

Day by day this same simple building material is offered to the cells of the body, no matter how varied in character may be the food which the individual consumes by mouth; complete gastrointestinal digestion takes care that the large and complicated albumin molecules of the food are broken up by blasting and splitting, until they are dissolved into the original building stones, and only these are permitted to enter the blood-current.

Thus the cells are not confronted with new problems whenever the character of the individual's food changes; they can work with the same tools, that is, with the same ferments at all times, because the material with which they build remains the same.

In the cell the amino-acids are still further reduced by fermentation; the resulting products are either burned up for the development of energy and heat, or else they are joined together for the building up of new albumin molecules. Each group of cells builds after plans which differ from those after which other groups of cells build; the resulting protoplasm differs in the various cell groups; the protoplasm in liver cells differs from the protoplasm in kidney cells; and this difference in protoplasm can be demonstrated by biological methods. The same methods prove that there is less difference between the protoplasm of the same organs in different species, than there is between the protoplasm of two different organs in the same individual; for example, there is less difference between the liver protoplasm of a dog and the liver protoplasm of a sheep, than there is between the liver protoplasm of a dog and his kidney protoplasm.

Under normal conditions the cells reduce the products of their metabolism to the simple building stones which they had taken from the blood; nothing is returned by them to the blood stream which retains the characteristics of their particular protoplasm.

Were it otherwise, the blood would soon be contaminated with material from various groups of cells, which other groups of cells could not use in their household and which, in many instances, would interfere with the functions of ductless glands. If, for instance, the ovaries were to send out substances for the activation of the thyroid gland and these hormones, while circulating in the blood, were to meet with particles of unreduced thyroid protoplasm, they would be intercepted and the activation of the thyroid gland would be prevented or impaired.

In a state of health the cells prevent such contamination of the blood; disease or injury, however, may cause them to pass insuffi-

ciently reduced protoplasm in such quantities that the lymphatic system, which is interposed between the cells and the blood-current as a safety mechanism, may be unable to prevent its passage.

Thus in affections of the kidney or the liver the affected organ may pass substances into the blood which still possess individual characteristics of kidney or liver protoplasm; the same is true of all other organs and tissues.

In cases of malignant new formations substances are passed into the blood which retain characteristics of the protoplasm of carcinoma, sarcoma or chorioepithelioma.

During pregnancy the outer covering of the chorionic villi, the syncytium, forms a constant source of blood contamination.

Germ invasion and malignant disease will not only contaminate the blood with their own characteristic material, but by injuring the cells of the invaded organ, they may likewise force these to pass unreduced organ-albumin.

In all these various cases of entrance of blood foreign material into the circulation, the organism tries to defend itself by mobilizing ferments which bring about the intravascular digestion of this material, thereby reducing it to the simple cleavage products of the albumin molecule with which the blood is familiar.

To be sure, the contaminating material is not always purely protein in nature and it may require quite a variety of ferments for its reduction, as for instance, when entire chorionic villi are washed into the circulation, but the proteolytic ferments are best known to us, because their presence can be readily demonstrated by the biological tests of Abderhalden, the dialyzation method and the optic method.

Abderhalden developed and perfected these methods during the last ten years, while he was intensely active in the study of digestion and of cell metabolism.

The results of his investigations during this period are laid down in a great many publications, most of which appeared in the *Zeitschrift fuer physiologische Chemie*. A mere glance at the titles shows how the work spread systematically and logically, until it led to the wonderful discoveries, which have carried Abderhalden's fame to every corner of the scientific world.

"Newer Views concerning the Structure and the Metabolism of the Cell" were followed by "Peptolytic Ferments in Animal and Vegetable Tissues"; next came "The Cleavage of some Polypeptides by the Red Blood-corpuscles and the Blood-discs of Horses and Cattle"; "Peptolytic Ferments in the Cells of Various Forms of

Cancer and Other Tumors"; "Ferments of Various Bacteria"; "The Applicability of the Optic Method to the Solution of Biological Questions;" "Protective Ferments appearing after the Introduction of Body Foreign Proteins, Carbohydrates and Fats."

This work was followed by an attempt to study the effect of the introduction into the circulation of material, which, though native to the body, was foreign to the blood. Experiments on dogs showed that such contamination of the blood stream was likewise followed by the mobilization of protective ferments.

At this period Abderhalden was induced to apply his methods of investigation to the study of the blood in pregnancy and particularly in eclampsia, because in these conditions the deportation of syncytial cells and chorionic villi, to which Veit and Schmorl had called attention, seemed to constitute a good example of the entrance of material foreign to the blood into the system.

The results were convincing and were published in 1910 in a journal devoted exclusively to obstetrics and gynecology, but the publication failed to arouse much interest, presumably because all investigations had been carried on by the optic method. In 1912 appeared the first publication on the diagnosis of pregnancy with the dialyzation method, and early in the same year was published the little volume on "Protective Ferments."

The work was now taken up by others and publications on the serodiagnosis of pregnancy appeared in rapid succession. Abderhalden placed himself and his laboratories at the service of all who were interested in the work and likewise, in numerous publications gave minute instructions in the dialyzation method.

In the United States the work was taken up in the early fall of 1912, but investigators were much handicapped by difficulties in securing the necessary apparatus and reagents, and in some instances, likewise, by a difficulty to secure full and detailed information on the subject, as all publications, up to March, 1913, were in German. They also had to work without the advantage of personal instruction by Abderhalden.

The first articles published in the United States were by Williams and Pearce of Philadelphia, McCord of Detroit, Losee and Jellinghaus of New York, and Schwarz of St. Louis; these articles helped to arouse interest in the work and gave much needed information regarding technic; they also pointed out many of the difficulties and sources of error attached to the dialyzation method.

These publications were followed by articles by Judd of Baltimore,

Gutman and Druskin of New York, and Jamison and Cole of New Orleans.

Publications from Italy, Russia, Germany and other countries are pouring in in a steady ever-increasing stream, and, with few exceptions, they do not only confirm every one of Abderhalden's statements, but they point to a strict specificity of these ferments.

To prove this specificity, beyond all reasonable doubt, pregnancy and cancer seem to offer the most promising field for investigation.

During pregnancy proteolytic ferments are always present, which cause cleavage of placental albumin; in cancer proteolytic ferments are always present, which cleave cancer-albumin. If a number of investigators should test the serum of pregnant cases and of cancer cases both against placental albumin and against cancer albumin, and should find that pregnant serum never causes cleavage of cancer-albumin unless pregnancy is complicated by cancer, and that cancer-serum never causes cleavage of placental albumin unless the cancer patient is pregnant, the proof of the specificity of the protective ferments will be perfect.

One such report has already been published by Epstein, who found that of thirty-seven cancer cases thirty-six gave a positive reaction with cancer-albumin, and all thirty-seven gave negative reactions with placental albumin; on the other hand, seventeen pregnant cases gave negative reaction with cancer-albumin, and positive reaction with placental albumin.

Gambaroff examined forty-five cases of cancer and five cases of sarcoma; forty-four of the cancer cases gave a positive reaction with cancer-albumin; five cases of sarcoma were positive with sarcoma-albumin; cancer serum was negative with sarcoma-albumin, and sarcoma serum was negative with cancer-albumin.

I have recently examined five cases of cancer against two different cancer-albumins and against placental albumin, and have controlled the tests with the serum of five pregnant cases; the cancer-sera gave strong reactions with cancer-albumin, and faint reactions with placental albumin, while the pregnant serum gave strong reactions with placental albumin, and weak reactions with cancer-albumin; the faint reactions seemed to be due to poorly prepared albumins and the tests will be repeated when better material is available.

In view of the many proofs of specificity it is astonishing that Heilner and Petri should take such a strong stand against it, basing their opinions on a very few experiments on human subjects. They bled two persons and tested their blood against various albumins and obtained negative reactions; they injected small quantities of the

serum back into the individual from which it was derived and bled the same persons again a very short time afterward and found now that the serum gave positive reactions with coagulated placenta, liver, muscle and other tissues.

It is easy to repeat this work, and I have no doubt that before long it will be shown that some errors must have crept into the work of these investigators. I have made only one of these experiments with absolutely negative results (see report of work) and do not feel inclined to follow it up, because in his first publication Petri reported the result of some experiments, which, likewise, have failed to stand the test of time.

In the Harben Lectures for 1907, Ehrlich, in speaking of the biological function of the amboceptor, said: "this I hold under physiological conditions to be that of seizing upon and elaborating nutritive substances."

Thinking that it was not impossible that these specific ferments were of an amboceptor-like nature, I induced Dr. Derivaux of the Washington University Hospital to prepare various placental antigens, and to test pregnancy serum for complement fixation by means of the hemolytic system used for the Wassermann reaction.

Dr. Derivaux did considerable work along that line, but the results were mostly negative; when alcoholic placental extract was used, there took place a partial inhibition of hemolysis. We next tried the dialyzation method and added guinea-pig serum as complement to inactivated pregnancy serum; the results were perfect, but unfortunately the controls showed that guinea-pig serum alone can cause cleavage of placental albumin. We were about to try non-pregnant human serum for complement, when my attention was called to a statement by Petri, in his first publication on this subject (*Centralblatt für Gyn.*, 1913, No. 7) in which he claims that he has demonstrated several times that by adding fresh complement to inactivated pregnant serum, no cleavage of placental albumin can be obtained.

Thereupon I dropped this work but recently Steising has found that adding male serum to inactivated pregnancy serum restores the cleavage power. I have lately repeated Steising's experiment with the serum of four different males, and in each case I have obtained decidedly positive reaction (see report of work). The specificity of the protective ferments seems assured; that they are of amboceptor-like nature needs further confirmation.

APPLICATION OF THESE TESTS IN OBSTETRICAL AND GYNECOLOGICAL PRACTICE.

It has been shown that the protective ferments are present from about the sixth week after the beginning of the last menstruation and that they disappear about two weeks after the expulsion of the ovum.

It will, therefore, be possible to confirm or to eliminate pregnancy in many cases which heretofore remained uncertain until other positive signs of pregnancy by their appearance or by their absence cleared the situation.

In most cases a careful consideration of the clinical history together with a thorough physical examination of the patient should go hand in hand with the serodiagnosis; exceptionally pelvic examination may have to be omitted, especially in cases of amenorrhea in girls or women who have no right to be pregnant. In all cases the result of the serodiagnosis should be safeguarded by a sufficient number of controls, and it should be remembered that a positive test simply means that the body of the person, from whom the serum is obtained, harbors or has recently harbored placental tissue. Ordinarily it means that the woman is pregnant or has been delivered within the last two weeks; exceptionally, however, living placental and syncytial tissue may remain in the walls of the uterus for a long time after the termination of pregnancy. Chorioepithelioma, as a matter of course, give a positive reaction; a case of chorioepithelioma reported by Paltauf, is especially interesting in this connection. What appeared to be a malignant tumor in a woman of sixty-one years of age was removed; the coagulated albumin from this tumor was not acted upon by cancer serum, but it was readily cleft by pregnancy serum. The microscopical examination revealed a chorioepithelioma. If the serum of this patient had been sent to a laboratory without the clinical history, a diagnosis of pregnancy would have been made, which would have been a mistaken diagnosis, although the reaction worked out correctly.

A negative diagnosis means that the body of the person examined no longer harbors living placental tissue; a hematocele resulting from a tubal pregnancy may contain a dead ovum and give a negative reaction. The fetus may be dead and undergoing maceration during any period of pregnancy, and such case will give a negative reaction. The negative serodiagnosis is very helpful in both cases, because it shows that in the first case quoted, fear of continued development of an ectopic gestation need not to form the indica-

tion for operating, and in the second case quoted it confirms the suspicion of the death of the fetus.

EXAMINATION OF SERUM IN TOXEMIA AND ECLAMPSIA.

In cases of toxemia and in eclamptic conditions the serum should be tested; it will be found that the cleaving power of such serum is often deficient or entirely absent. In that event it should be restored by intravenous, subcutaneous or intramuscular injection of normal pregnant serum.

Ruebsamen found little cleavage in ten out of thirteen cases of eclampsia; control by the optic method showed in five cases a rotation of only 0.06° . These were mild cases and recovered; in a fatal case cleavage was entirely absent; a case of hyperemesis gave, likewise, a weak reaction with the dialyzation method, which was confirmed by control with the optic method.

Ruebsamen is inclined to believe that the stronger the cleavage power of eclamptic serum, the greater are the patient's chances of recovery. He has recently treated two cases of pregnancy dermatoses with injections of normal pregnancy serum and effected prompt cures; the serum, 20 c.c. in the one case, and 10 c.c. in the other case, was injected into the gluteal muscles. After the treatment the serum of the one case showed normal cleavage power, that of the other was not examined (private information).

In the obstetrical service of the University of Pennsylvania, in the service of the New York Lying-in Hospital and in the obstetrical service of Washington University, all eclamptic and toxemic cases are at present examined in regard to the cleavage power of their serum. Therapeutic injections of normal pregnancy-serum are made when opportunity offers; the cases observed are as yet too few in number to be used statistically, but it is hoped that such cooperation will in due time furnish reliable information regarding this important subject.

For experimental purposes these institutions can secure sufficient human serum of unobjectionable character; if the treatment proves successful, it may be desirable to use serum of pregnant animals for treatment of such cases on a larger scale. The recent investigations of Schlimpert and Issel furnish additional proof that serum of pregnant mares and pregnant sheep effect the cleavage of human placental albumin.

EXAMINATION OF SERUM IN CANCER.

In all malignant disease the serum should be tested against placental and against cancer albumin; the examination should be controlled by testing pregnancy serum against these same two albumins. In this manner the specificity of these ferments will soon be demonstrated; the serodiagnosis of cancer will be of the greatest value when localities are affected from which it is not possible to obtain material for microscopical examination, and it will be especially valuable in the diagnosis of cure or relapse after radical operations. Patients so operated should have their blood examined from time to time, until it may be safe to pronounce them permanently cured.

In all important examinations, especially when the findings conflict with the result obtained by other investigators, the dialyzation method should be controlled by the optic method (see technic).

REPORT ON WORK DONE IN THE OBSTETRICAL SERVICE OF THE
WASHINGTON UNIVERSITY MEDICAL SCHOOL.

Repetition of Petri's Experiment.—Healthy male negro, forty years old; on September 4, 1913, 10 c.c. of blood are drawn at 7 A. M. (before breakfast); at 11 A. M., 2 c.c. of the man's own serum are injected intravenously; another 10 c.c. of blood are drawn at 12 M. (five hours after breakfast); at 4 P. M., six dialyzers are charged with 1.0 of placental albumin and 1.5 c.c. of serum each; the six portions of serum represent the following conditions: (a) pregnant serum; (b) pregnant serum inactivated; (c) male serum No. 1; (d) male serum No. 1 inactivated; (e) male serum No. 2 (after the injection of serum); (f) male serum No. 2 inactivated. The dialyzers are placed in the incubator and kept at 37° for twenty hours; at 12 M., September 5, the dialysates are tested with ninhydrin; the one obtained from the active pregnant serum gives the usual strong positive reaction; the other five dialysates give absolutely negative reactions.

Repetition of Steising's Experiments.—On four different occasions active male serum was added to inactivated pregnant serum, and in each case a pronounced positive reaction was obtained; the reaction was not quite as deep as the one obtained from the same pregnant serum before inactivation.

The result was exactly the same in each of the four experiments, so that the record of the first one, made August 16 to 17, suffices to illustrate this work:

Dialyzer No.	Placental albumin	Pregnancy serum		Male serum		Result with ninhydrin
		Active	Inactivated	Active	Inactivated	
1.	I.O	I.5 C.C.	.....	.....	.....	+++
2.	I.O	.....	I.5 C.C.	.....	.....	.....
3.	I.O	.....	.....	I.5 C.C.	.....	.....
4.	I.O	.....	I.5 C.C.	I.5 C.C.	.....	++
5.	I.O	.....	I.5 C.C.	.....	I.5 C.C.	.....

APPLICATION OF THE BIOLOGICAL TEST FOR DIFFERENTIAL DIAGNOSIS.

In twelve instances serodiagnosis has been employed to clear up cases of doubtful nature; eight of these are included in my report to the American Medical Association, the other four were one of early pregnancy; one of pregnancy in the second month in a woman of forty-eight years, one of pyosalpinx and one of incomplete tubal abortion.

In these twelve cases the biological test led to the correct diagnosis; all tests were controlled by inactivation and by the examination of a case known to be pregnant, and of another case known not to be pregnant. The record of one case is here given for illustration:

Mrs. K., nineteen years old, married five months, was sent to the hospital on September 2, because she had been losing blood from the uterus for five weeks and had pain in the left iliac region; this pain had been noticed for a few days, but was not intense on September 2; patient had not missed any menstrual period; the uterus was not noticeably enlarged; it was anteflexed and movable; to the left of the uterus a small tender mass could be felt. September 4, 10 c.c. of blood were drawn and the biological test was made, with the following result:

Dialyzer No.	Placental albumin	Pregnancy serum		Suspected ectopic serum		Male serum active	Result with ninhydrin
		Active	Inactive	Active	Inactive		
1.	I.O	I.5 C.C.	.....	.....	.....	.....	++
2.	I.O	.....	I.5 C.C.	.....	.....	.....	.....
3.	I.O	.....	.....	I.5 C.C.	.....	.....	++
4.	I.O	.....	.....	.....	I.5 C.C.	.....	.....
5.	I.O	.....	.....	.....	.....	I.5 C.C.	.....

Laparotomy September 8; outer half of left tube contains a hemorrhagic ovum of the size of a pigeon's egg; chorionic villi and amniotic cavity in evidence; no embryo.

One case of eclampsia and two cases of hyperemesis gave measurably weaker reactions than normal pregnancy serum.

Forty-one cases known to be pregnant gave positive reactions; thirty cases known not to be pregnant gave negative reactions; the nonpregnant cases included all sorts of gynecological disease, pus tubes, fibroids, cancer and a few male patients; the cases used for Steising's and other experiments are not included in these numbers; they bring the number well above the hundred mark.

I mention this merely to show that my associates and I have done a reasonable amount of work; we have no intention to publish long series of cases; indeed, Abderhalden's methods do not lend themselves to such wholesale work.

TECHNIC.

Dialyzation Method.—The experience of all the many workers in this new field has brought out the fact that, unless strict asepsis and chemical cleanliness is practised, trustworthy results cannot be obtained, and that in all investigations, the results of which are to be compared with those of others, it is absolutely necessary to follow identical methods; to use uniform quantities and concentrations, and to extend dialyzation over the same period of time.

All glassware must be perfectly dry; centrifuge-tubes, dialyzers, containers, bottles for preserving albumins and dialyzers, pipets for handling serum must all be sterile; pipets, test-tubes and graduated measures for other parts of the work, should be sterilized from time to time, and should be cleansed with distilled water, absolute alcohol and ether in the order named each time they have been in use; the hands of the workers must be kept dry and clean, and must never touch dialyzer, albumin, serum or dialysate; mere manual touch of these important factors in the test may cause a wrong reaction, especially if the person is perspiring.

Testing and Preserving the Dialyzers.—The dialyzing thimbles of Schleicher and Schuell are the only ones recommended. Until lately we have used No. 579; these were from old stock and quite reliable, but when the sudden demand for dialyzers sprang up, the quality decreased considerably. These dialyzers have a diameter of 16 mm., and are 100 mm. high; we cut off the top 40 mm. to make them more suitable for this particular test. At present we use No. 579 (a) which is made specially for this work; it is, likewise, 16 mm. in diameter, but only 50 mm. high. These thimbles come in boxes of 25; they are of varying quality; a good many of them are so tight that they

will not dialyze peptones; others are so loose that they will permit albumin to pass. It will be found that about 50 per cent. of these newer thimbles are impermeable to albumin and permeable to peptone; these are the only ones to be reserved for actual work and the rest have to be eliminated.

The thimbles when taken out of their box are dry and hard; they are soaked in cold water for at least six hours; their upper border is threaded with a silk loop for more convenient handling; it is also desirable to mark each thimble so that its work can be easily controlled; for that purpose we use white and blue glass beads strung on the silk loop, using from one to six blue beads, and from one to six white beads after the thimbles have been tested. It is necessary to push the loop with the beads inside of the container before boiling them, as otherwise they become entangled; these thimbles are boiled for five minutes and are then ready to be tested.

Test for Permeability to Peptone.—The thimble is picked out of the water in which it has been boiled by means of a sterile forceps, and charged with 2.5 c.c. of a 1 per cent. solution of peptone (at present we use Seiden-Peptone) to which are added five drops of toluol. The top of the thimble is closed by a sterile artery clamp, the outside of the thimble is washed under the hydrant and flushed with distilled water. The thimble is now placed into a container and suspended from the top by the silk string in such a way that the outer fluid stands 1 c.c. higher than the contents of the thimble, the string being held in position by the cotton plug, which is replaced. The container must be so narrow that the distance between its inner wall and the wall of the thimble does not vary much from 0.25 cm. For containers we use at present so-called hydrometer jars, that is, cylinders with a foot, and a glass rim around the top. These are 14 cm. high, and have an inside diameter of 2.5 cm.. The containers are plugged with absorbent cotton and have been sterilized before the test; they have been filled with 20 c.c. of chloroform water covered by a layer of 1 c.c. of toluol.

After inserting the thimble and replacing the cotton plug, the dialyzing apparatus is put into the incubator and kept there for twenty-four hours at a temperature of 37°.

The outer fluid is now tested for peptone. The only reagent we use is ninhydrin in 1 per cent. solution; this is kept in an amber-colored vial. The pipet with which it is measured must be perfectly dry, as otherwise the strength of the solution will be changed; it is not desirable to keep more of this solution made up than one expects to use within two weeks, as it is apt to deteriorate.

In making the test we use only half the quantities of dialysate and reagent which Abderhalden recommends. At first we were forced to do so, because it was impossible to secure sufficient quantities of ninhydrin; we have retained this modification, because by using good-sized test-tubes, there is not the slightest danger of boiling over.

From the dialysate 5 c.c. are transferred to the test-tube by means of a graduated bulb pipet, care being taken not to carry over any toluol. To this is added 0.1 c.c. of the 1 per cent. solution of ninhydrin and the contents are now brought to the boiling-point over a spirit-lamp or a small Bunsen burner. It is essential that the boiling should be continuous and even, and that it should be kept up for exactly one minute from the moment at which real boiling has started; mere simmering does not suffice. If peptone is present in the dialysate, the tested fluid will assume a violet-blue color, which becomes deeper as the fluid cools; half an hour is necessary to bring out the reaction in doubtful cases. In testing dialyzers for permeability to peptone a good strong reaction should take place at once, but all tests made should be placed in a row, with the containers and the respective dialyzers behind each test-tube; at the end of half an hour the majority of the tests will show an even intensity of color; all thimbles, whose dialysate has given a deeper or a fainter or a negative reaction, are eliminated.

Test for Impermeability to Albumin.—The thimbles which have survived the peptone test are cleansed in running water and soaked in it for six hours; they are again boiled for five minutes and the same manipulations are gone through as in the peptone test, with the only difference that the thimbles are charged with 1.5 c.c. of serum. Formerly we used larger quantities of serum, mostly animal serum, but very often large quantities of human serum and relatively small quantities of animal serum will give dialysates which react positively with ninhydrin without there being a leak in the thimble; therefore, we are now using human serum in the quantity employed in actual tests; whenever there is a venesection in the hospital, we secure enough serum to test many thimbles; at other times, we secure serum in smaller quantities in various ways.

The same precautions are observed in this test as in the peptone test; after twenty-four hours the dialysates are tested with ninhydrin, and only those thimbles which give an absolutely negative reaction are retained for actual work. The faintest streak of bluish color, visible only when looking through the entire column of the tested

fluid when it is held over a white background, eliminates the respective thimble.

Those thimbles which have stood both tests successfully, are again cleansed and are now marked with white and blue beads, as mentioned before. Beads and strings are tucked away inside of the thimbles to prevent entanglement and they are again boiled for five minutes and placed by means of a sterile forceps into a sterile glass jar two-thirds filled with chloroform water. A layer of toluol about 1 c.m. thick is poured over the chloroform water, and the jar is closed with a sterile glass lid. It is convenient to place twelve thimbles in each jar.

When needed for work the thimbles are again cleaned and boiled, and they are always cleaned and boiled in the same way after each experiment.

Much annoyance is saved if one subjects each thimble to rigid control from test to test; a thimble which in one actual test has given a negative reaction, surely does not leak and should be used in a place where a positive reaction is expected in the next test; the one that has given a positive reaction surely is permeable to peptone, and should be placed in the next test in a place where the reaction ought to be negative; in this manner any leak in the dialyzers will be discovered before it works serious damage; when two or three begin to leak, it is best to throw the whole set away and start a new one.

Preparing and Preserving the Albumin.—The rules for preparing albumin from placenta apply to the preparation of albumin from other tissues, except nerves and brain. It should be remembered that placental albumin is the easiest to prepare, because there is no trouble in obtaining fresh material; the difficulties encountered in preparing reliable placental albumin multiply when work with other tissues is undertaken and should be constantly borne in mind.

The organs or tissues should be absolutely fresh. To prevent autolysis, they are immediately cut into small pieces, about the size of hazelnuts, and washed in running water, until they are absolutely free from blood. Material which is not blood free, is unsuitable for work, even after the danger of autolysis is removed by efficient boiling, because the serum often contains ferments which cause cleavage of the form elements of the blood. In the case of placental albumin, for instance, such impurity of the albumin might give a positive reaction with serum which has absolutely no cleaving power for syncytial tissue. We must remember these possibilities and offer to the serum an albumin which is made exclusively of the one tissue, with which we wish to seek for ferments.

Schlimpert and Hendy found that it was impossible to wash placenta blood-free with the hydrant water of Freiburg; they finally succeeded when washing first with normal salt solution, and next with distilled water; the same difficulty may exist in other places.

It should, likewise, be remembered that, while it is desirable to do this work as quickly as possible, one should not stop until the object is attained.

In the case of placenta we proceed as follows: The placenta is born into a sterile basin; it is immediately wiped clean of blood;

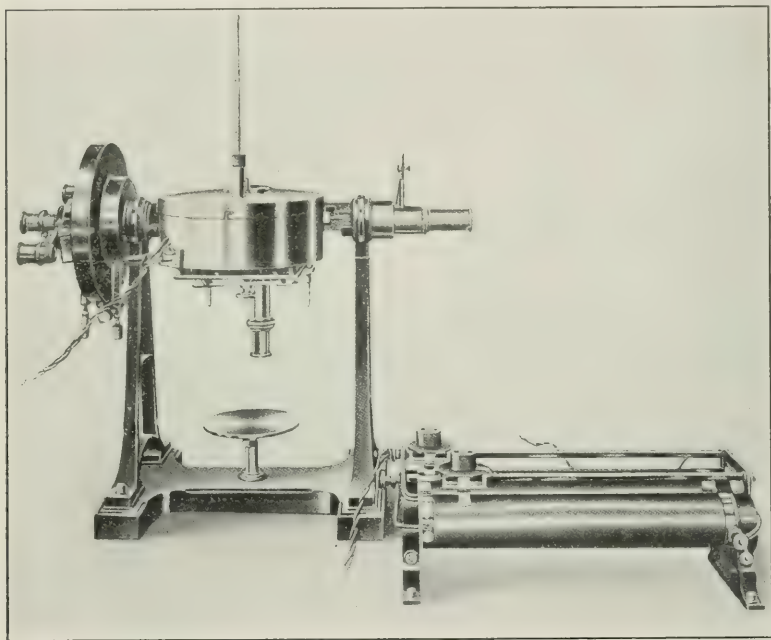


FIG. 1.

membranes, cord and the top layer of the placenta (chorionic membrane) are cut away. It is not necessary to remove the decidua serotina; the remaining portion, consisting principally of placental villi, is cut into small pieces about the size of hazelnuts, which are washed in running water, until they are free from blood and become white. Frequently pouring them into a cloth and squeezing them out hastens the process. In the meantime half a gallon water has been brought to the boiling-point in an enameled pot; two drops of glacial acetic acid are added to this, the pieces of placenta are thrown in

and boiled for five minutes, and are then poured on a strainer. We now use metal strainers, which are easily handled and sterilized. Up to this point everything should have been done as quickly as possible. Now we take our time and cut this boiled tissue into pieces about the size of small peas, because we have found that after sealing a piece of tissue by coagulation on the outside, and cutting it into smaller pieces just before wanting to use it, that it will again require repeated boiling before it is fit for use. The boiling process is repeated twice; after the third boiling the mass of tissues is estimated and boiled once more five minutes in about five times its volume of water. The contents of the pot are now emptied into a sterile strainer placed over an enameled pitcher; some of the water of this boiling is filtered through a hardened filter (Schleicher and Schuell, 575), and 5 c.c. of this filtrate are tested with 1 c.c. of a 1 per cent. ninhydrin solution. If the test is absolutely negative, the albumin is placed by means of a sterile spoon into sterile salt-mouthed, glass-stoppered, amber-colored bottles of 30 c.c. capacity; in each bottle are placed about 12 gm. of albumin; this is covered with chloroform water, and the bottle is filled with toluol and placed into the ice-box.

If the reaction is not negative the first time, it is best to throw the albumin away. For reasons which are hard to explain, some placenta will not give a negative reaction after many boilings. McCord therefore advocated the use of desiccated placenta; King and Lindig later made the same suggestion; Losee has given this desiccated placenta a fair trial and finds it unreliable.

Method and Care for Securing the Serum.—We secure usually 10 c.c. of blood from a vein in the arm, as a rule from the median basilic, under the same aseptic precautions and in the same manner as we do for bacteriological work.

The sterilized needle must be perfectly dry. Whenever possible the patient should be fasting at the time, for at the height of digestion the blood is apt to contain dialyzable substances, which give the ninhydrin reaction. The blood is drawn into a sterilized centrifuge tube and allowed to stand at room temperature for from two to four hours, at which time from 3 to 4 c.c. of serum have separated which is poured into another sterile centrifuge tube, and centrifuged to throw down the few form elements, which it may still contain. The use of a pipet is not advisable in this transfer, as there is danger of disturbing the blood clot, and of carrying over a considerable number of form elements. This might interfere with the test, as a study of Abderhalden's article on the cleavage of polypeptides by the red blood-corpuscles and the blood-discs makes

intelligible. The remaining portion of the serum, still in the first tube, is likewise centrifuged; it is inactivated by heating it in the water-bath to 60° for thirty minutes and used in some of the controls. Serum that shows the least trace of hemolysis is unfit for use. The serum may be kept on ice for two or three days, but the sooner it is used, the safer is the test; we have never worked with serum that was more than twenty-four hours old.

Importance of Proper Controls.—To prove that whatever reaction we obtain is due to fermentation and not to the presence of dialyzable substances giving ninhydrin reaction in albumin or serum, we duplicate each test with inactivated serum. A control in which albumin alone and serum alone are used, gives no protection, because the albumin and the serum may each give off a certain small quantity of these substances, but not enough to bring about a reaction, while a combination of these substances from the two sources, may easily reach the required minimum to give the ninhydrin reaction. We further control each test for pregnancy with serum from a normal pregnancy case; this serves as a comparison, and it also proves that the placental albumin is reliable. For still further control we use the serum of a nonpregnant person, preferably from one who suffers with a condition which may give rise to the formation of protective ferments; this gives proof of the specificity of these ferments, or at least of the absence of such ferments in the blood of normal individuals.

Description of an Actual Test.—The contents of a jar of placental albumin is poured upon a sterile strainer and washed under the hydrant until it is entirely free from toluol and chloroform; it is next washed in distilled water, and it is then thrown into about five times its volume of boiling distilled water, and boiled for five minutes. If 5 c.c. of the filtered water from this boiling give absolutely negative reaction with 1 c.c. of 1 per cent. ninhydrin solution, the albumin is fit for use and is divided into portions of 1.0 each, which are dropped into the sterile dialyzers. To each thimble is added 1.5 c.c. of serum; an ordinary test requires six dialyzers, one each for active and inactive pregnant serum, one each for active and inactive serum from the person on whom the test is made, and one each for active and inactive nonpregnant serum.

When the making of a correct diagnosis is very important, it is best to duplicate the above, using two dialyzers for each kind of serum; thereby the chance of error on account of a faulty dialyzer is reduced 50 per cent.

When dealing with conditions associated with great destruction

of the body proteins, it is advisable to work with only 1 c.c. of serum.

Five drops of toluol are added to the contents of each thimble, which is handled exactly as described in the test with peptone, except that the sterile containers contain 20 c.c. of distilled water, as the chloroform water would interfere with the fermentation in the actual test. A thick layer of toluol (1 c.c.) covers the outer fluid, and the six or the twelve containers are placed in the incubator.

The experiment should not be interrupted before twenty hours, because it has been shown that the ninhydrin reaction appears after eight hours and reaches its greatest intensity after twenty hours, remaining constant after that time. At the end of this time, each dialysate is tested with the ninhydrin reaction. We test 5 c.c. with 0.1 c.c. of the 1 per cent. solution, boil evenly for one minute, place all the test-tubes in a row and read off the results half an hour after the last test-tube has been placed on the rack.

All dialysates from controls with negative serum must remain colorless; also the one from the active serum of the nonpregnant case; the serum of the pregnant case must show a nice violet-blue reaction. If the dialysate from the active serum of the suspected case shows a similar reaction, the examination has given a positive result, which, with the reservations mentioned, means that the respective person is pregnant.

COLORIMETRIC SCALE FOR CLASSIFYING THE INTENSITY OF REACTIONS.

It is customary to speak of weak, medium strong, strong and extra strong reactions. It seems reasonable to compare these reactions with the color given with the ninhydrin test when 5 c.c. of solutions of amino-acids of standard strength are tested with 0.1 c.c. of the 1 per cent. ninhydrin solution. For this purpose we use at present the following solutions of erepton, 1:2000; 1:4000 and 1:6000, and mark these color gauges 1, 2, 3; reaction below and including 3 is weak; reaction above 3 and including 2 is medium strong; reaction above 2 and including 1 is strong; reaction deeper than 1 is extra strong; a reaction of the intensity of a 1:2000 erepton solution corresponds nearly with the reaction of normal pregnancy serum during the early and middle months. For permanent gauges we have matched the color reaction of the various ereptone solutions with solutions of crystal-violet (Gruebler) in alcohol; these should be kept in the dark when not in use.

THE OPTIC METHOD.

It is highly desirable that for important investigations and for all new findings the result of the dialyzation method be controlled by the optic method.

So far no work by the optic method has been published except by Abderhalden and his pupils, because the firm of Schmidt and Haensch of Berlin has been unable to furnish the special apparatus with the electrical heating device and the small tubes especially intended for this work (see illustration). They hope, however, to fill some of the earlier orders before the end of the year. Placental peptone for the optic method has been placed upon the market, so that there will be no difficulty in the optic investigation of pregnancy. Other peptones (cancer, kidney, liver), will be forth-coming, if the demand justifies their manufacture.

BIBLIOGRAPHY.

European Literature.

The reader will find a complete list of publications on this subject in the second edition of Abderhalden's book: "The Protective Ferments of the Animal Organism," J. Springer, Berlin, 1913; he is also referred to the files of 1913 of the following German medical weeklies: *Muenchener medizinische Wochenschrift*, *Berliner klinische Wochenschrift*, *Wiener klinische Wochenschrift*, *Zentralblatt für Gynaekologie*.

American Literature.

Schwarz, Henry. Serodiagnosis of Pregnancy and its Practical Application. *Interstate Med. Journal*, March, 1913.

Williams, P. F., and Pearce, R. M. Abderhalden's Biological Test for Pregnancy. *Surg. Gyn. and Obstetrics*, No. 4., 1913.

McCord, C. P. The Employment of Protective Enzymes of the Blood as a Means of Extracorporeal Diagnosis. *Surg. Gyn. and Obstetrics*, No. 4, 1913.

Schwarz, Henry. Practical Application of Abderhalden's Biological Test of Pregnancy. *Interstate Med. Journal*, May, 1913.

Jellinghaus, C. F., and Losee J. R. The Serodiagnosis of Pregnancy by the Dialyzation Method. *Bull. of the Lying-in Hospital of the City of New York*, June, 1913.

Judd, C. W. The Serum Diagnosis of Pregnancy. *The Journal of the A. M. A.*, June 21, 1913.

Gutman and Druskin. The Serodiagnosis of Pregnancy. *Med. Record*, July 19, 1913.

Schwarz, Henry. The Serodiagnosis of Pregnancy. *The Journal of the A. M. A.*, Aug. 16, 1913.

Jamison, C., and Cole, J. C. The Serodiagnosis of Pregnancy. *New Orleans Med. and Surg. Journal*, Sept., 1913.

ACUTE INTESTINAL STRANGULATION CAUSED BY. A
FREAK ABNORMALLY MISPLACED APPENDIX.¹

BY

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(With One Illustration.)

THE Jacksonian prize essay of Mr. Frederick Treves,⁽¹⁾ published in book form as far back as 1883, on intestinal strangulation, has, since its issue, been a standard work on that interesting subject, and to the present date I doubt if any medical author anywhere has surpassed the painstaking research necessary to produce a work of its character in that special line.

Among many other classifications, he gave the relative frequency of the various forms of strangulation depending on cicatricial bands and false or acquired diverticula caused in women by pelvic peritonitis and in men by typhlitis, perityphlitis, and a very small portion due to appendicitis, these latter being slightly more frequent in men than in women. He also gave those caught in the true or congenital diverticula (Meckel's diverticulum), which, when present, we know is attached to the last 2 or 3 feet of the ileum and remains open and patulous at the umbilicus, representing the vitelline duct of the embryo. This has always been considered a common cause of strangulation.

In the above classifications of strangulation, the case I here present may most properly be reported. Under this head there were 210 cases collected and Mr. Treves divided them into seven forms, giving the number of cases operated on in each class as follows:

1. Strangulation under isolated peritoneal adhesion.....60
2. Strangulation under diverticula and diverticular bands.....40
3. Strangulation by knots and nooses formed by bands,
4. Strangulation by knots and nooses formed by diverticula,
5. Strangulation due to an adherent appendix. 3, 4, 5.....25
6. Strangulation through slits in the omentum and mesentery. 20
7. Strangulation under omental ligaments.....15

In classes 3, 4 and 5, there were but twenty-five cases, and of the whole number I judge the appendix was not the cause in over 5 per

¹ Read before the Twenty-sixth Annual Meeting of the American Association of Obstetricians and Gynecologists at Providence, Rhode Island, September 16-18, 1913.

cent. of the total strangulations and to this day these figures may be taken as fairly representing the probable relative frequency of the various forms of strangulation, at least in England, but in this country nearly all of our inflammations of the intestines are attributed to the appendix. Therefore, strangulations due to that organ in the United States would possibly have a higher percentage.

Unique or rare cases are occasionally occurring, such as that reported by Mr. Holmes, where a loop of the ileum became strangulated by passing through a hole formed by the fusion of two or more appendices epiploica, which were attached to the sigmoid flexure of the colon. Strangulation through holes in the great omentum has frequently been reported and Dr. Quain described a case in which the cause of death was not clear and where at autopsy it was discovered that 40 inches of the ileum had passed through a slit in the broad ligament of the uterus, and become strangulated. Other bowel strangulations have been reported where portions of the intestines passed through and became strangulated in the foramen of Winslow, and a few have been cited as passing through slits in the suspensory ligament of the liver.

The nearest approach I can find of strangulation to the one I wish to record is that by E. Gillespie(2) of England, reported on March 23, 1912, in the *London Lancet* from which Murphy's General Surgery (General Medicine Series) 1913, vol. ii, of Chicago, makes a splendid plate which I reprint with comment.

In Gillespie's case the obstruction was caused by an acutely inflamed appendix surrounding the gut, its distal end rupturing and becoming attached to the mesentery of the ileum quite a few inches of which finally became strangulated by the gradually constricting effect of the inflamed appendix. The patient was admitted to the hospital with a diagnosis of bowel strangulation, and immediate operation first brought to light that the cause of the strangulation was the diseased and gangrenous appendix. All symptoms of appendicitis, when the patient arrived, were obscured by those of strangulation, even the coils of intestine showing through the abdominal wall by the characteristic step-ladder appearance of obstruction.

A similar case I know of personally, but not reported, occurred in 1908, when Dr. A. Ralph Johnstone of Chicago was called upon to operate on one of his internes suffering from complete bowel obstruction. After opening the abdominal cavity he found a large section of the ileum strangulated by an elongated acutely inflamed appendix. This case was similar in almost every respect to the case of Dr.

Gillespie. Johnstone's patient made a rapid recovery because of early operative interference, while Dr. Gillespie's died in twenty-four hours after operation, seven days after the onset of the disease, six days of which were practically wasted in giving home treatment and making a diagnosis, without his knowledge.

Sir Risdom Bemist reported a case where the inflamed appendix became adherent to an enlarged ovary on the right side and beneath

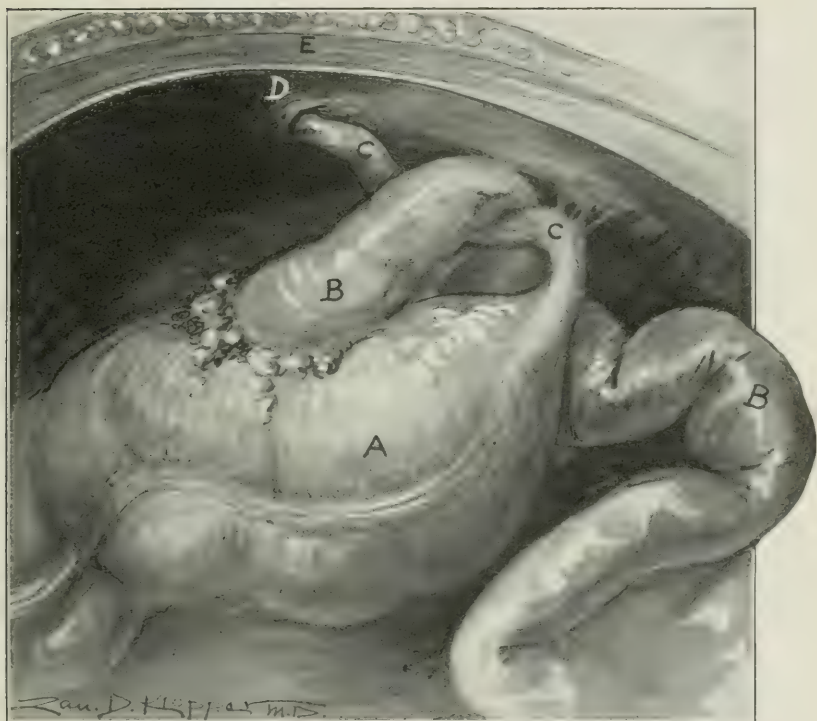


FIG. 1.—A sectional view of abdominal cavity at Median line looking from left side of patient. A. Cecum congenitally(?) suspended well above the pelvic cavity. B. B. Ileum. The portion hanging over loop of appendix was strangulated. C. C. Appendix congenitally(?) attached at distal and proximal ends to abdominal peritoneum. D. Abdominal peritoneum. E. Abdominal wall.

the cord then formed, a loop of the ileum and a part of the ascending colon were constricted until complete obstruction took place.

A few other constrictions and bowel obstructions due to the appendix have been reported, but all have had one or more attacks of appendicitis previous to or associated with the attack of strangulation. In the case I now report the appendix, although abnormally

situated upon the abdominal peritoneum, in all other respects had no indication of ever having been inflamed.

CASE REPORT.—At 2 A. M. on July 27, a hurry night call brought me to the bedside of Mr. B., aged twenty-one, gas fitter, who was in agonizing pain over the entire abdomen, the wall of which was very much distended, the rectum dilated, and the patient extremely restless with a subnormal temperature and rapid pulse.

Appendicitis had been diagnosed by the physician called at the onset of the attack, but pressure immediately over the cecum did not cause greater pain or distress than was already being suffered by the patient; while pressure near the umbilicus gave a great deal more pain and distress. Hence from the signs and symptoms the patient complained of, viz., great pain, rapid pulse, subnormal temperature, abdominal tenderness and distention accompanied by the awful fear depicted in his facial expression, appendicitis might easily have been indicated as was diagnosed. Yet pressure over the iliac fossa, failing to increase the pain, which pain usually radiates to the umbilicus from pressure over the cecum indicated not appendicitis, even if the appendix had been normally located, but some other intestinal trouble possibly intussusception, volvulus or strangulation by bands, etc. The patient was immediately ordered to the hospital, as delay was dangerous and immediate operative interference imperative, for while there are some successes from gas inflations, water injections and tractions in the reduction of bowel obstruction, it did not seem wise to take chances with their uncertainty and with the delay caused thereby, and the conditions discovered subsequently proved these procedures would have been utterly useless.

After general anesthesia and hasty preparation, the incision was made slightly above the McBurney point, where upon opening the peritoneum, the cecum promptly appeared hanging above the abdominal wound, quite healthy, with no induration and no appendix to be felt in the ileocecal fossa by the examining fingers; however, there were marked adhesions above the wound along the abdominal wall, evidently of recent origin. These, at first sight, apparently suspended the healthy cecum in the abdominal cavity, and helped strangulate a mass of small intestines which were now a coffee color. After they were broken up and the section of the ileum which it was supposed they constricted was carefully brought out upon the abdominal wall and surrounded by hot packs, then the appendix, which could not be found in its normal position, was easily discovered perfectly healthy with its distal end attached to or rather deeply imbedded into the abdominal wall near the umbilicus. Its mesentery was spread out fan-shape, having strong abdominal attachments, just above and to the right of the pubic arch, the appendix and mesentery looking as though they were there attached congenitally. The cecum seemed suspended congenitally in the abdomen, well above the pelvis.

Then in the space between the appendix and the abdominal wall, in which the intestines were strangulated and through which they had in all probability gradually entered when the patient rested or

was sleeping on his abdomen (a position he usually assumed when resting or sleeping) and gradually passed until through this opening a large loop of them overhung to the left, and more finally filled this space tightly, until strangulation and obstruction were completely effected.

There are three very unusual, if not unique, conditions apparent in this case.

First.—Bowel strangulation by the healthy appendix.

Second.—The unique location of an apparently healthy appendix, which looked as though it were congenital with this patient, for neither he nor his relatives when closely questioned could recall any illness of any kind to account for the condition.

Third.—Suspension of the cecum above the pelvis by the peculiar attachment of the fan-shaped mesoappendix and the distal end of the appendix itself to the abdominal peritoneum and muscles, this was also apparently congenital, no recent or chronic inflammation appearing at these points, and, as above stated, the patient gave no history of ever having an attack of appendicitis, typhlitis or perityphlitis.

The suspension of the cecum entirely out of the pelvic cavity in this manner is unique, so far as I can discover, and while the appendix situated above in the manner described is not to be desired in preference to the normal, yet it had some advantage over the normally situated appendix, in that it was less likely to have the inflammations from fecal concretions or foreign bodies that frequently occur in the normal position, even though there was no valve at its junction with the cecum, as frequently happens, its higher position preventing the entrance of foreign substances, so that inflammation by continuity from typhlitis or perityphlitis was about all that could have infected the appendix thus suspended, outside of a general peritonitis or a solid packing of the cecum with fecal matter, neither of which conditions had ever of course taken place and no inflammation of this appendix or cecum or sufficient inflammation of any nature, it seems, had ever occurred to account for its abnormal location.

It is difficult in the confines of a short report to prove this case to be of congenital and not traumatic origin. Yet when we contemplate the child, its infancy, in sickness and in health, the modern woman corseted, compressed and contorted from childhood to old age, some especially so at a period of married life when they might well be proud of their part, in the creation of their offspring and especially if their disfigured condition is not caused by the lack of food and overwork of the poor mother, but due to social functions

and contortions of pride or dress to hide the condition they should with modesty be elated at and glory in. With these external causes of distortion and the many contortions and natural cycles and changes peculiar to embryological and fetal life, "the wonder is" not that there is an occasional freak of nature in the intestines, but that there are so few disfigured human beings both internally and externally.

Howard Kelly(3) in his investigations on the embryology of the appendix, which were made in his effort to account for the many deviations and perplexing variations which he found from the normal, maintains the appendix is morphologically and structurally merely a portion of the cecal pouch which has remained in an early stage of development. The cecum arises from the outer and posterior side of the so-called caudal limb of the intestinal loop, between the sixth and seventh weeks of fetal gestation, the small intestines increase in length forming a number of loops and contortions which lie within the umbilical cord occupying its proximal portion, partly in front and partly behind the budding cecum. At the seventh and eighth weeks there begins a rotation of the so-called cranial and caudal portions of the intestines around each other, until the cecum which was previously concealed now lies above the small intestines. At this time a transient vermiform appendix appears representing a stage in the life of the human cecum which at one time more nearly resembled that of the Mangabey monkey or the Gibbon. This, however, disappears and at the end of the eighth or ninth week, the intestines have almost entirely receded from the umbilicus into the fetal body.

Dr. Kelly(4) differs from many other embryologists in maintaining that at about this period of fetal life, the posterior vascular folds of the cecum are slightly to be differentiated and begin to develop into the mesoappendix at about the tenth week, then the cecum with its newly formed appendiceal fold skirts along the free border of the liver and later, usually between the fourth and seventh months, but occasionally still later and sometimes not completing the cycle until after birth, the cecum with its appendix and the colon make a revolution through an arc of 180 degrees around their own long axis which is completed just before locating in their normal position. During this process one can readily imagine a perfect fusion taking place at the points described, of the distal end of this man's appendix and the mesoappendix with the abdominal peritoneum at that time and occurring at about one-half of its revolution (90 degrees)

which was about the position this cecum was found to maintain to the normal.

I wish here to emphasize the fact that retention and suppression of urine to a marked degree were present in this case, this being a common factor in nearly all cases of acute bowel strangulation where the pain is very severe, and especially if the ileum is the part of the intestines involved in the strangulation. I would also call attention to the extreme distention of the rectum and descending colon being present, which is a sign differentiating between strangulation and appendicitis. In the former it is always present to a marked degree, in fact in this case the examining hand could discover nothing but the greatly distended rectum and sigmoid in the pelvis with a very much distended bladder, which condition is not nearly so common and often does not occur at all in appendicitis.

I would also call attention to the enormous abdominal tension in these cases of complete bowel obstruction from septic gases, the reduction of which is often difficult and even impossible under general anesthesia, either in the Trendelenburg or any other position. This condition was forcibly impressed upon me when another case of complete bowel obstruction presented a few days after the one reported above, and when an expert anesthetist having a vast experience gave both ether, chloroform and finally ethyl chloride, each being crowded to the limit of the patient's endurance without appreciably relaxing the abdominal wall tension, thus making control of the small intestines difficult and in my effort to find the point of strangulation several feet of the distended bowel were shot out of the abdominal opening several times, causing undue exposure of the intestines with greater danger of peritoneal infection, so that in similar cases one should consider using spinal anesthesia even as the anesthetic of election, and in cases of excessive abdominal wall tension, which cannot be overcome at once by general anesthesia, spinal anesthesia should be immediately resorted to, for in such cases there is great danger in overcrowding general anesthesia.

Fortunately in Case II, there was a healthy large omentum which we used to cover the many lacerated bowel peritoneal surfaces, caused in separating the very extensive adhesions that were present. This beautiful omentum undoubtedly supplied at once a good protection, helping to return a healthy circulation to the denuded intestines and thus helped to prevent a general peritonitis, a very possible condition in his case for forty-eight hours or more. In Case I, on the other hand, not a particle of omentum could be found, although careful search was made for this valuable intestinal pro-

tector, so that in view of the many rare conditions present, in Case I it may be considered as having some rare abdominal freaks of nature.

I desire to thank Dr. E. B. Neff who assisted and who observed all the conditions in the first case and vouches for them as above stated; also Dr. R. E. Robbins, who gave the anesthetic; likewise Miss Graff and her two assistant surgical nurses, all of whom came up from bed smiling at the sweet hour of rest (3.30 A. M.), which speaks volumes for the kind fatherly and motherly discipline given by Dr. A. Ralph Johnstone and his superintendent to their interne staff and corps of nurses at Lake Side Hospital.

REFERENCES.

1. Jacksonian Prize Essay on Intestinal Strangulation by Mr. Frederick Treves, 1883.
2. *London Lancet*, March 23, 1912.
3. The Vermiform Appendix and Its Diseases, Howard A. Kelly, A. B. M. D., and E. Hurdon, M. D., 1905, Chapter IV, p. 56.
4. Same, p. 62.

4118 STATE STREET.

OPERATIVE TREATMENT OF MAMMARY CARCINOMA.

BY

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(With Sixteen Illustrations.)

FEW surgeons have had much fear in recent years of local recurrences following excisions of the mamma for carcinoma since due care is taken regarding adequate skin and fascial removals. Complete removal of all axillary lymph nodes and all lymph bearing tissues again reduced the fear of secondary recurrences by a very large percentage.

The use of the x-ray, post-operative, as an additional safeguard against recurrences has proven disappointing to many surgeons who have under its influence noted rapid dissemination of carcinoma.

With improved operative technic including early and complete mammary and axillary excision of all tissue which might possibly

lodge carcinomatous infection, the benefits from the greatly lessened recurrences were offset largely by the fact that 31 per cent. of cases operated upon (see statistics by Dr. Greenough) for carcinoma of the mamma had edema and swelling of the arm and many to the degree of incapacity. In my own experience, and this is corroborated by numerous other workmen, pain of a gradually increasing severity accompanied the edema and incapacity or was independent of one or both. The pain when present gradually increased in intensity and became agonizing and unbearable.

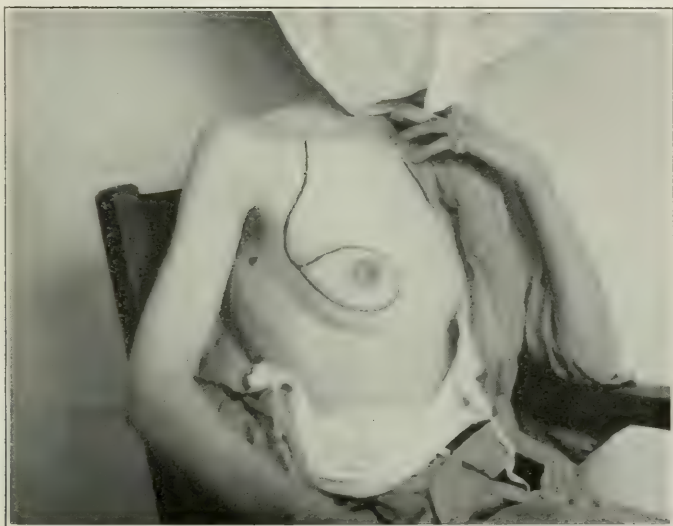


FIG. 1.—Represents the general or usual incision of the integument. The spot directly below the axilla indicates the point where the stab drain passes through the posterior flap. This drain is left in place usually two to four days. It often becomes necessary to modify this incision on account of the variation in location and extent of the malignant deposit.

Some of my cases I am sure would have been very thankful for a return of the carcinoma to end their misery. The cause was not far to seek, many surgeons were loathe to remove the pectoral muscles which were rarely involved, besides the removal of the pectorals was believed to seriously impair the power and usefulness of the arm.

The result was that most operators after removal of all the glands and adipose in the axillary space as well as the mamma left the axillary vessels and nerves entirely denuded for their entire length in this space. The dead space thus formed could not be collapsed and as a result a cicatricial granulating tissue material grew in the axilla surrounding these important structures and as time elapsed

gradual contraction made their bite a thing to be dreaded by me equal to if not more than the original trouble.

It is impossible to collapse the axillary space with the pectoral muscles intact and this inability to close the space favors suppuration and increases the amount and final density of the cicatricial tissue filling the space. Bringing the arm against the side only

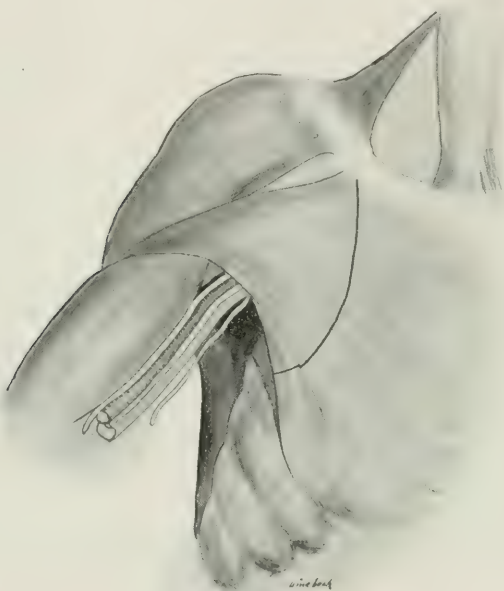


FIG. 2.—Indicates the line of section of the pectoralis major. The finger is passed under the muscle and the muscle is cut by the scissors. The pectoralis minor is sectioned in the same way but a little farther out.

reduces the amount of cicatricial tissue but does not prevent its grasping the vessels and nerves while it insures the serious limitation of the arm movements by binding the arm to the thorax and at the same time nullifying the benefits of the pectoral retention.

Removal of the pectorals made it possible to force the integument down into the axilla and thus more easily close the space, but skin, thoracic wall and axillary vessels all bound together by cicatricial granulation tissue were found to be quite as serious in their obstructive and compression bite as to follow the plan of leaving the muscles intact.

In 1902 a pupil of mine, Dr. I. S. Buzard, operated for mammary

carcinoma and again the next year did a secondary operation for recurrence on the same patient. In 1904 I was called by Dr. B. to relieve the patient if possible from the terrible pain incident to compression of the axillary nerve cords by the cicatrix which closed the old dead space resulting from the axillary enucleation which he had

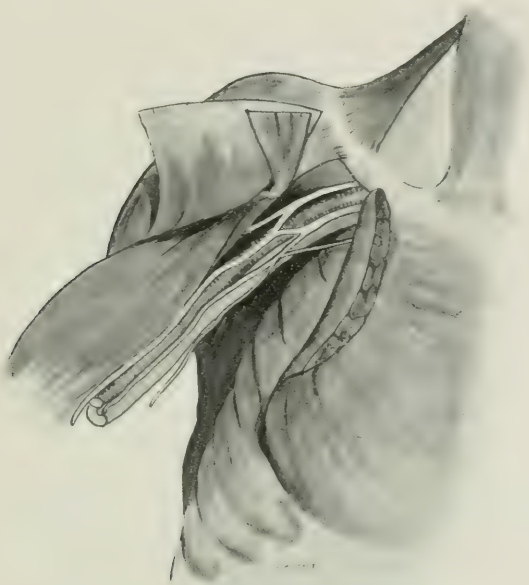


FIG. 3.—Represents the axilla exposed and all glandular and all gland bearing tissue removed with the distal part of the pectorals turned outward and the inner portion ready for removal as serving no longer any useful purpose.

done according to my teaching. There was no recurrence of the carcinoma and the patient was well, save from the cicatricial limitation of movement and the unbearable compression pain. Suffice it to say we lost the patient from hemorrhage and exhaustion following a prolonged dissection trying to free these structures from the vise-like cicatricial bite.

Since then in every case of excision of the mamma and axillary enucleation I have divided the pectorals from the clavicle to the lower border of the axillary space and the outer part of the muscles are then retracted outward and the inner portion retracted inward thus at once freely exposing the entire axillary space which is rapidly and easily cleared from above downward under easy sight at every step. The glands and adipose tissues of the axilla are

surrounded by gauze as the enucleation proceeds and they are finally removed with the mamma going wide of all probable deposit.

The inner or thoracic portion of the pectorals I usually remove as they can serve no useful purpose and may represent a danger, though small.

The distal part of the pectorals which were retracted outward



FIG. 4.—The inner part of the pectorals removed and the distal part of the pectorals sutured in position in contact with the axillary vessels so as to obliterate the axillary space entirely and prevent the formation of cicatricial compression tissue.

are now brought back and carefully sutured to the thoracic wall above and to the latissimus dorsi and teres major below directly in contact with the axillary vessels and nerves so as to entirely obliterate all dead space and reduce to an infinitesimal amount the cicatricial tissue which will or can form between the elastic pectoral perimysium and the vessels.

The advantages of this procedure are not alone the complete obliteration of the dead axillary space but the reduction of the danger of sepsis by prolonged drainage from a non-collapsible space and the preservation of quite or almost perfect power and range of movement.

The outer part of the pectorals is quite as strong as the entire muscle but allows at first a slightly lessened range though later the patients usually complain of no limitations of movement. Some of my patients deny absolutely any diminution of either range or power of the arm.



FIG. 5.—Mrs. S. (aged 45) Operation done eight days before but sutures not removed until the next day. The drainage opening always made in the posterior flap shows directly below the axilla. Union was immediate throughout without a particle of pus formation. The tubal drain was left in position three days.

The extensive undermining needed to secure coaptation and very wide tegumentary excision caused a peculiar outline to the wound though the incision originally followed very closely the outlines indicated in Fig. 1.

Now the 12th day after operation she can put her hand unassisted on top of her head.

Again, the distal part of the pectorals used in this procedure have never been known to be secondarily involved in carcinoma and so may be used without a particle of hesitation to cover the axillary vessels, obliterate the axillary dead space and eliminate the compression curve of edema, impaired or destroyed function and torturing pain of 31 per cent. of these unfortunate cases.

Two years after I begun the use of the above method Dr. J. B. Murphy, I learned, was using a strip from the lower border of the pectoralis major for the purpose of covering the axillary vessels

and nerves after enucleation to overcome the cicatricial contraction. Later he at times used the latissimus dorsi in the same way for the same purpose.

I have not been able to learn the exact date when Dr. Murphy began his work, but in 1906 he published an article on the subject and illustrated his operative method.

I began the method, which I have not found it necessary or wise to vary, in the early part of 1905. Impelled by the same necessities,



FIG. 6.—Mrs. S., five weeks after operation showing range of movement. The arms were extended and maintained without pain or discomfort. Convalescence was uninterrupted.

Dr. Murphy and myself, without any knowledge of the other's work, were using muscular tissue to cover in the axillary vessels, to fill up the dead axillary space and prevent cicatricial edema, limitation of motion and pain. The plan I have used, practically without variation, preserves the entire muscular strength of the pectorals only shortened and perfectly closes in and obliterates the space. The blood and nerve supply to the distal part of the pectorals is retained without serious impairment. Some of my cases have been able in

eighteen days to put the hand well above the head and none after a few months have any marked limitations of range in movement. I have not promised any of my patients that the power and use of



FIG. 7.—Photo of Mrs. C., 18 days following excision of left mamma, all axillary lymph nodes, and inner portion of the pectoral muscles. The distal portions of the latter were sutured to the chest wall and lower border of the *lattissimus dorsi*, both muscles being placed in contact with the axillary vessels and nerves. In this manner the entire axillary space is obliterated.

Patient was able to place arm in position shown in photo without aid or discomfort, but the hands were clasped so as to minimize the liability of movement during exposure of the plate as the photo was taken under adverse circumstances.

the arm would be perfect but some of them declare positively that the use of the arm is perfect in power and range in all positions.

Mrs. M., operated upon five years ago, writes, "I have just as good use of it as the other arm notwithstanding you told me I never would. I can rub on the washboard, carry coal and water and use it just the same as the other one and there is never any soreness, pain or stiffness of any kind."

Miss S. Patient operated upon four and one-half years ago writes, "The arm goes up as straight as it did when I was in gymnasium



FIG. 2.



FIG. 9.

practice. The effects that I notice are that in reaching for things at a distance it will not stretch quite as far as formerly, the elasticity seems less, besides I cannot hold out a weight for more than a moment. I presume that with a little regular practice that could be easily overcome."

Extract from Mrs. C's letter: "I can button any article of clothing down the back that is not too tight. I can clasp my hands behind my head and lie down on them so. I can put my arms akimbo. I can stand flat against the wall and lay my arms straight up the wall. In fact, if you were to require any kind of test, with the exception of lifting, I think I could easily do it. I have refrained from lifting anything beyond the weight of an ordinary book. I can play on the piano some little time without much fatigue. Can

sweep a little. Less than two weeks ago I swept four rooms and a hall, the longest task I have attempted since I came home six months ago."

I have used this method exclusively for eight years and in no case has a patient suffered edema, pronounced impairment of function of the arm or suffered pain from compression. The method there-

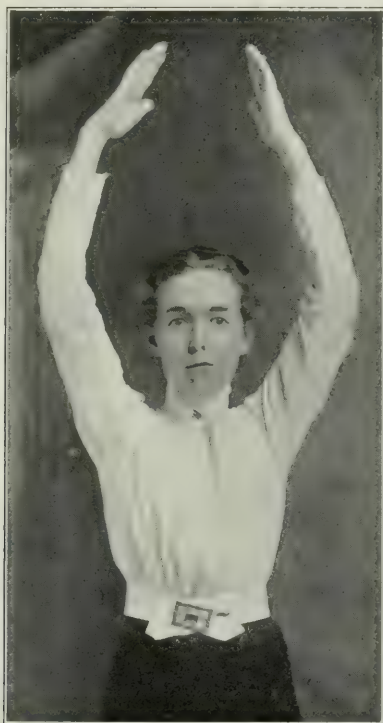


FIG. 10.

fore appears, without adding a complication of any kind, to entirely overcome the dangers and disadvantages of axillary enucleation.

The advantages of my plan would appear to be utilization of the least dangerous part of the pectorals while there is little or no loss of range or power, and at the same time the object of protecting the axillary vessels from cicatricial compression is perfectly accomplished.



FIG. II.



FIG. 12.



FIG. 13.



FIG. 14.



FIG. 15.



FIG. 16.

FIGS. 14, 15 and 16.—Mrs. M. five years after operation showing appearance of operation site and range of movement.

DISCUSSION ON THE PAPERS OF DRS. ROSENTHAL AND RUTH.

DR. FRANK D. GRAY, Jersey City, N. J.—I notice that these photographs explain nearly all the movements that are naturally made by the arm, except the movements which bring into play the pectoral muscles. If I remember rightly, there was no photograph showing they were not impaired.

DR. RUTH.—The photographs were taken with the exception of one, eighteen days after operation.

DR. ROBERT T. MORRIS, New York City.—I would like to ask the essayist if he employs this method when there is rather advanced carcinoma involving the pectoral muscle.

I was at work in Hamburg with Heidenhain thirty years ago when he first made a demonstration of epithelial nests in the pectoral muscles. I was deeply impressed with the insidious involvement of the cellular tissue planes of the pectoral muscles. If in some cases there is far advanced involvement of the breast with carcinoma, I would feel that some of the nests remained in distant parts of the muscle.

DR. LOUIS FRANK, Louisville.—Having in our experience found that the pectoral muscles were at times involved, we have made it a practice in our operations for carcinoma of the breast to remove the pectoral muscles *in toto*, both the major and minor. Possibly the women in our section of the country are different from those in other parts of the country, but impairment of function has not been noted to such extent that we would deem it necessary to retain a portion of the pectoral muscles to prevent any functional deficiency that may otherwise have been present.

With reference to these pictures: it has not been my experience to find the serratus located in such a manner as to make suturing possible such as shown on the plates. The edema we have seen, except in a few instances, has not been due to obstruction of vessels, as much as it has been due to the removal of the lymphatics. It is a lymphedema and not a venous stasis we have to deal with. It seems to me, we cannot by any method of dissection or muscle implantation, get rid of cicatricial tissue. There are no vacuums in nature in the human body, and where we dissect tissue or make incisions, the cicatrix always becomes attached to underlying structures. Wherever cicatrices form they are histologic fibrous tissue and this is true of all healthy processes. So the object of this particular operation is defeated if we bear in mind the histological processes in the healing of wounds.

In regard to the paper of Dr. Rosenthal: if we have the striking similarity, and if we have the exact analogy, as the doctor says, between cancer of the breast and cancer of the uterus, it is useless to discuss vaginal operations for the removal of carcinomatous uteri. It is an absolute impossibility to tell by vaginal operation how extensive the glandular involvement may be in carcinoma of the cervix. In speaking of carcinoma of the cervix, no matter how small or how short the duration, and how small the extent of the

cancerous involvement of the cervix, it has been my practice, in order to benefit my patients, to open every abdomen in which we have to deal with carcinoma of the uterus for the purpose of satisfying myself and the individual that there is no intraabdominal glandular involvement. The most promising cases have proved inoperable after the abdomen is opened. In the cases we think a radical operation justifiable and after opening the abdomen consider the condition favorable, we are doing the Wertheim operation.

In cancer of the body of the uterus we have an entirely different proposition to deal with, and these are to my mind the most favorable cases, the body of the uterus being one of the most favorable locations for carcinoma considered from the standpoint of cure. In my own experience I have never seen a recurrence where the uterus has been totally removed. The glandular involvement is usually not very extensive. In discussing the operation of cancer of the breast, I wish to refer to the matter of gauze dissection of the enlarged glands and of the axilla. If we are to get the best results in our operations for carcinoma, there must be an anatomical dissection with forceps and with the knife, or with a scissors, preferably the knife. The very thing Dr. Rosenthal speaks of, the dissemination of carcinomatous cells, takes place by gauze dissection. It is absolutely impossible to remove some of the cancerous areas we have in carcinoma of the breast by means of gauze. We know that. You have got to use the knife in dissecting glands off the axillary veins; you cannot get the carcinomatous areas off by gauze dissection. Further this gauze dissection squeezes out the cancer juices and brings about the very condition he is decrying.

As to the harmlessness of excision for diagnosis: if excision is done a week or two or three before the radical operation there may be danger of dissemination, but in suspected cases, where the microscope is necessary (and microscopic examination should be carried out in all cases for the purpose of confirmation even after removal), for a preoperative diagnosis, this diagnosis should be made while the patient is under the anesthetic, the operation proceeded with or abandoned, and not a lapse of ten days or two weeks permitted to intervene.

DR. HUGO O. PANTZER, Indianapolis, Indiana.—It is with some hesitation that I mention my practice in cancer of the mamma. For several years before Halsted reported his method of operating in cancer of the mamma, I operated according to the teachings of Volkmann. Volkmann was the first to find and emphasize the fact that cancer of the breast early involved the fascia of the pectoralis major muscle, and that the disease only rarely transcended this structure and involved the muscle proper. At that time I stripped the entire pectoralis major muscle of its fascia, and included a thin parallel layer of the adjacent pectoralis musculature. Under the sway of Halsted's report, I was led to follow his course in operating, and removed the entire pectoralis major and minor muscles. The gratifying results obtained by the former less mutilating method, as found by repeated reports from old cases, have more

recently led me back to this method. At present I do again a large per cent. of my breast cases, at the early stage of the disease, without removing the entire pectoralis major and minor muscles. It is needless to say that the most painstaking removal of the fatty, *i.e.*, lymph-bearing tissues in the axillary, subclavicular and interpectoralis regions, is done invariably in all cases. Nothing short of full statistics—more than one man's practice can give—shall determine ultimately what structures it is necessary to remove, and what structures may be retained. For my part, it seems justifiable at present to perform the less radical procedure in many cases. In regard to the displacement of the pectoral muscle as advised by Dr. Reed, I feel there is good reason to consider it. The edema and pain following operation in some of these cases cause such distress as to make their avoidance most insistently to be wished for. I think we may be more sparing of the skin and subcutaneous tissue in some of our cases, and thus avoid part of this trouble by covering the wound more generously. I have been impressed with the fact that there are relatively few cases that come back for secondary skin recurrences, and that these few are operated with success in the large majority. Nor should we expect differently from *a priori* reasoning. The lymph channels running through the subcutaneous tissue, owing to the extensive removal of the gland-bearing tissues, have their communication cut off, and what cancer cells are retained, are commonly speaking confined to a local growth. It certainly is striking that so few cases show skin recidives, and that the greatest percentage of those having skin recidive is permanently cured by early local excision.

With regard to the case reported by Dr. Rosenthal, wherein he curetted and the microscopist failed to find malignant disease in the scrapings, and yet the future course of the case revealed cancer, it is well to bear in mind the difficulty of determining the true nature of the disease by microscopical examination. Nowhere is human effort perfect. But here the responsibility rests with the pathologist. However, what Dr. Rosenthal should have done in his case, was to scrape again the uterus and submit anew the tissues to the pathologist. It is probable then the positive evidence of cancer would have been found in time, when operation was yet justifiable.

DR. GORDON K. DICKINSON, Jersey City.—Experience teaches and in Dullas' Surgery, published in 1818, in connection with amputations of the breast it is advised first, to get around, lift it up without separating it from the axilla, dissect upward and clean out the axilla. His work did not receive much attention until Moore, an Englishman, first enunciated in an article that the proper operation for amputation of the breast was to include the pectoral muscles, etc. Now, we all have to go back to our knowledge of disease process before we can continue with any method of operating, and Heidenhain and Handley have made elaborate examinations into the spreading cancer cells in the lymphatic structures. You remember, you do not have any spreading of the disease according to the lessons in the physiological laboratory when you throw in

colored fluid; cancer cells follow the larger lymphatic channels. In Porier and Sappy's anatomy you see how they come upon the fascia and proceed in all directions. We know the general flow is from the muscle to the fascia and from the breast to the fascia; at the same time, if the channels get plugged up the extension is retrograde. I have seen recurrences in the pectoral muscle close up to the humeral bone. Because of the experience of edema, because of the researches of Heidenhain and Handley, and because of another reason I remove all muscle. I do not think the pectoral muscle has much to do with the motion. I think it is the deltoid. We have in New York one resourceful man, Dawbarn, who is constantly picking up tricks. Some years ago he suggested the idea of transplanting portions of the deltoid. He accomplishes what Dr. Ruth accomplishes. He covers over the muscle and blood-vessels and gives a larger working deltoid, according to his report.

With reference to the paper of Dr. Rosenthal, anyone who has been in Vienna and watched Schauta and Wertheim has come to a knowledge of the fact that Schauta does not know where Wertheim lives, and Wertheim does not know where Schauta lives. They are both working along different lines and both men are behind the gun. They hide themselves. You have got to have Wertheim and Schauta die before statistics work out. (Laughter.)

Hugh Young has done a lot of prostatectomies through the perineum. We men cannot do the work he does. Time will work that out. So it is with the Schauta operation. You can see him go into the vagina, fixing up and go about the ureters, and get the parametrium, as well as Wertheim ever did, and he does it with as little hemorrhage as Wertheim. The Wertheim operation is very good, but it is apt to be bloody. I think the Schauta operation has got a future. I think practically you can take away as much of the tumor by the low operation as by the high.

DR. RALPH WALDO, New York City.—Just a word with reference to Dr. Ruth's paper. The first time I cut away the pectoral muscles, I expected the patient to be crippled so far as motion of the arm was concerned. I was surprised to find that she was not. I had, in a few cases following that method, decided restriction from cicatricial tissue. At present, I remove the pectoral muscles, also the fascia, which is most important, and any glands I can find, and then in the subsequent dressings have the arm entirely free. My patient never has the arm restricted more than twenty-four hours and seldom that length of time. They are usually out of bed in twenty-four to forty-eight hours. I wish I could show you a patient I saw last Sunday, on whom this complete operation was done five months ago, removing both pectoral muscles and the fascia. The patient, whose case is typical of others, told me that she has as good motion of the arm as she ever had, and I believe it is very largely due to the fact that the arm was never restricted.

Regarding the propriety of leaving these tissues, I would challenge that, because, it seems to me, it is a step backward, considering the clinical results of many good operators, also the microscopic

findings of cancerous tissue in and about the fascia and in the substance of the pectoral muscles.

DR. J. H. CARSTENS, Detroit.—I feel a good deal like the gentleman who has just spoken. I think very much depends upon how we manage these cases afterward. I have always insisted that the fascia was more dangerous than the lymphatics, and I thoroughly remove the fascia and the muscle. Sometimes I leave a little strip of the muscle. I take off the glands, but I start in the axilla and work downward, because I think we have less danger of absorption or reinfection if we cut down, and I cut very quickly, so that there is no danger of reimplantation. I take the breast out in about two minutes. I remove the glands and such other things as I think necessary. I allow my patients to use the arm from the beginning. First, I put in a rubber drainage tube in the axilla, let it drain for three or four days, and then take it out, and it is all dry. As soon as healing has taken place, I instruct the patient to move the arm and massage it, and it is wonderful how you can put skin on the bare ribs and everything will be soft and movable in a short time, just by thorough massage and making the patient use the arm from the first day. That is very important. It has more to do with the movement of the arm than anything I know of. I cut away as much as possible and my patients do not complain about restriction of the movements of the arm. It is true, they may have some trouble in executing certain movements with the arm at first, but the freedom of movement is great in a short time.

Regarding the removal of the uterus, I feel pessimistic about it. I do what Schauta does and what Wertheim does, and what they all do, and we in the present state of our knowledge cannot tell whether or not we remove all of the cancerous tissue. I think Schauta has proved by his investigations and numerous sections of the glands in the pelvis, that they may be all free from cancerous tissue, although the uterus was badly diseased, yet there were little lymphatics way up under the diaphragm which contained cancerous cells. These run through the little lymphatics in the pelvis, and some of the cells may extend up to the liver. You can take out all the glands in the pelvis and the uterus, together with the parametrium, and yet there may be a couple of glands you never find. These may be near the liver or the stomach or somewhere else, and are going to break out afterward, and we are never sure in the present state of our knowledge that all the cancerous tissue has been removed.

We must try to operate early on these cases. I have removed with the curet scrapings from the uterus, examined them and have said they were cancerous. I have taken out the uterus, examined it, and no cancer was discernible. Now and then we may remove a uterus for benign disease. If the pathologist makes a mistake I cannot help it. Perhaps there may have been a little bit of cancerous tissue removed by the curet, and the woman might have recovered without any vaginal hysterectomy. But the point I want to make is this: in the present state of our knowledge we cannot tell

whether all of the disease has been removed or not. We do not do much harm if we remove enough tissue, and then we are on the safe side. It is better to remove a little more than not enough.

DR. WILLIAM EDGAR DARNALL, Atlantic City.—A good deal has been said about the limitation of mobility of the arm, but there is one point that has not been mentioned. I think a good deal depends upon the location of the incision. Those cases on which I have operated, who have had difficulty in the motion of the arm, have had the axillary portion of the incision made too high. If the incision runs up at all on the arm it will limit motion, but if the incision runs right down into the axilla there is no difficulty in mobility, although I have removed all of the muscle or the greater part of it. I think the location of the incision in the axilla has a great deal to do with the question of mobility.

DR. RUTH (closing the discussion on his part).—In all my work in the last eight years I have utilized this method in cases of advanced carcinoma. I used it in one case in which ulceration was extensive, and there was no sign of recurrence after three years.

In regard to the edema noted in the photograph, I disposed of that in my statement. If we had time, we might throw some of the slides on the screen again, but it is unnecessary to do so. I made the measurements of one case myself, and the other photographs were taken at a distance, and reports made in regard to the capacity of the arms. There is no difference.

In regard to the matter of cicatricial formation and contraction, there is no question but what there must be some cicatricial repair in every case, and even if you spare the distal part of the pectoralis, remove the fascia that may be involved on either side, as well as cleaning out the axilla, it stands to reason, if you can bring the muscular tissue in contact with the vessels, you will have a minimum amount of cicatricial tissue formed. This is a decided advantage or gain over a cicatricial mass which is great in extent and has no elastic base behind it, as is constituted by the muscular tissue itself.

The most careful operative manipulation of the mammary gland may dislodge carcinomatous elements and discharge them into the axilla be the manipulation ever so gently made. But if you start above, you can control the situation at once, cleaning out the axilla from above downward, and not making gauze dissection, but being careful to remove every particle of this tissue. You have started by dissecting from the clavicle downward, enveloping all excised tissue with gauze to prevent contact infective implantation into territory that has not been already involved. I have seen cases in which that has occurred in the abdominal wound when operations have been done for malignant trouble on the adnexa, producing implantation of typical carcinomatous material in adipose tissue where we could not expect it to occur primarily.

I am basing my statements on the report of Greenough which takes in all of New England, and he reports that 31 per cent. of these cases present edema, impairment of function, pain, or all com-

bined and the pain in these cases is unbearable. It is to avoid this, that I use this method.

As to the secondary involvement of the pectoral muscles themselves, Murphy has only known it to occur in one case, and none other has been reported to my knowledge but the one just mentioned by Dr. Dickinson, and I question if that would have occurred had the fascia been removed.

In regard to placing fat in the axilla, I would not want to use it because its vitality is too low and it lends itself too readily to the spread of infection. You cannot close the axilla entirely; you have to provide some drainage, and as fat represents a minimum amount of vitality and a maximum of liability for infection, I prefer to use material that possesses greater power, with no material impairment of its blood and nerve supply.

DR. ROSENTHAL (closing the discussion).—My trouble has not been with loss of motion after these extensive operations on the breast. As a rule, these people have good use of the arm. I do not bandage the arm. My trouble has been edema. I have been under the impression that the extensive removal of lymph structures has much to do with this edema. Since it has been found that a plastic of the muscle over the vessels seems to reduce the danger of the edema, I have been using it.

By the way, I was a little embarrassed in bringing my statistics, a total of sixty-two cases, before you. If we consider all cases not heard from and all cases operated within the last year, as dead, there would still be only twenty-five cases dead out of sixty-two. Even this would be an unusual result. I tried to make a reasonable apology in the body of my paper for laying before you such unusual statistics. Out of twenty cases operated on up to 1908, sixteen are living. Of those dead in the total list some lived more than five years.

With reference to gauze dissection, one should be careful. The glands have a decided capsule; do not break it or cut into it.

Coming to the relative value of the abdominal and vaginal operations and replying to Dr. Frank, I was of the same opinion in reference to the abdominal radical operation seven years ago when I published a paper on the subject, reporting some few cases, but it has been proven to the satisfaction even of Wertheim, that the removal of the glandular involvement in the pelvis is not material. Where the glands are involved in cancer, those cases are hopeless, and where the glands are inflammatory, they will take care of themselves. Abdominal radical hysterectomy is a dangerous procedure, one which carries with it a high mortality.

Hemorrhage has never disturbed me in this operation. It is not a bloody operation in my experience. The advantage of the vaginal operation is that of lesser mortality. The ureters are the only organs that are to be feared, and forsooth in cancer of the uterus you will operate in a blind way and necessarily hug the malignant tissue which is infectious, producing metastasis later. Therefore, you will hug the tissues as closely as possible to avoid the ureters

and you are willing to operate in the dark and at the expense of completeness just because you are afraid of the ureters. Any operation that will lay bare the ureters, is just as good as any other operation that does the same thing. The parametria, not the pelvic glands are the analogue of the fascia and glands of the breast operation. It is in the parametrium we have recurrence, and in the ordinary hysterectomy, abdominal or vaginal, it is in the parametrium and vault of the vagina we have infiltration and recurrence, and the only advantage that accrues from the greater operation, the abdominal or vaginal, is laying bare the ureters. Operate in a clear field where you can do surgery, directing your efforts to the extirpation of the cancer and cancer-bearing area unhampered by the fear of wounding or ligating a ureter.

PUERPERAL INFECTION DUE TO GAS-FORMING BACTERIA.¹

BY

EMERY MARVEL, M. D.,

Atlantic City.

CIVILIZATION has given to society comfort, ease and luxury, for which there has been exacted from woman increased dangers in child-bearing. Lesser exercise has defeated physical development, brought a reduction in the caliber of the birth canal, and weakened her propulsive forces. Luxuries have diminished her general resistance, and comforts have taken from her the adaptation which necessity commands. Laceration of the genital outlet, damages from pressure, and a greater tendency to exhaustion of an already weakened general resistance indicate the penalties exacted. To atone for these added penalties civilization should, and does, lessen relative hazards. Certainly fewer lives have been sacrificed by child-bearing in the last half-century as a result of Dr. Oliver Wendell Holmes' valuable contribution to a better understanding of the cause, and the means for prevention as applied against scarlet fever carried to the puerperal woman. There is no doubt that a clearer understanding of the impaired kidney function associated with pregnancy has saved lives that otherwise would, without this knowledge, have been sacrificed in the child-bearing act. Certain it is that the recognition of the microorganic foes, and a better knowledge of the means to fight them, has greatly diminished the mortality resulting from parturition and prevented lives from subsequent invalidism. And yet how hopeless seems the physician's efforts in

¹ Read before the Twenty-sixth Annual Meeting of the American Association of Obstetricians and Gynecologists at Providence, Rhode Island, September 16-18, 1913.

saving those who have been infected with certain of these microorganisms through avenues made available only as a result of conception and its subsequent delivering. The occasions of these cases startle the community in which they occur, throw horrors into prospective mothers and give fears to those eligible for conception. These tragedies, though infrequent they may be, cry for still greater efforts upon the part of each of us to lessen, if not entirely eliminate, the existing jeopardies incident to woman's most noble effort, the accomplishment of motherhood.

"Puerperal Infection an Indefinite Term."—When reference is made to "Puerperal Infection" it conveys the idea of that time subsequent to the expulsion of uterine conception when microorganisms invade the woman. This reference does not in its usage convey any clear understanding as to the character of the invading enemy. The term as used was adequate for its purpose, no doubt, when antedating any knowledge that defined the difference in the character of the organisms or the manner of their operations. Since bacteriologists have identified various microorganisms common to this diseased condition, and pathologists have studied and recognized the characteristic differences in their operations, it is no longer sufficient to be content with a diagnosis so general, but it behooves us to know exactly what organism is the factor in the infection. To know this fact is of great importance in order that one may establish a successful warfare against the enemy. No longer would the physician be justified in treating all chills and fever by one and the same method without determining the cause of the chills and fever in the particular case. Whether the chills and fever be due to a cholecystitis, an obstructed pyelitis, empyema, malaria or another cause matters much, for in each the treatment is different, and diversely different, in order to obtain the desired relief. It is little less important that the special bacterial factor be determined in a puerperal infection. To determine whether the invading organism is a streptococci, staphylococci, colon bacilli, pneumococci, or bacilli aerogenes capsulatus becomes all important if we hope to give the most efficient care to the afflicted.

Gas-forming Bacteria.—It is our desire to call attention in this discussion to that form of infection occurring during the puerperium which is associated with gas formation in the tissues. This form of infection has been properly termed gas-sepsis. The colon bacillus is a gas-forming bacillus, but as pointed out by Welsh⁽¹⁾ and others, its gas-forming function takes place only in the presence of carbohydrates. Klotz and Holtzman⁽²⁾ after analyzing the gas-

forming bacteria described by Welsh, Fränkel, Veillon, Zuber, Lindenthal, Kruse, Sternberg and Buday state: "We feel that the production of gaseous gangrene in life is in the majority of cases due to the infection by *bacillus aerogenes capsulatus* or one of the members of this group and that gas formation in the tissues by *bacilli coli* remains unproven." It is the *bacillus aerogenes capsulatus* that commands our especial consideration. The bacillus was discovered by Welsh and described by him and Nuttal⁽³⁾ in 1892. Welsh recovered it from the blood. It is not an uncommon occupant of the intestinal canal and is common to the soil about closely inhabited districts. Lahey⁽⁴⁾ easily gained growths from the soil of Boston. Surgically it is found most often in wounds of the extremities, especially in crushed wounds of legs. While it finds its way into the circulation, the progress is usually made by extending its operation through the continuity of tissues, selecting the course of least resistance. The progress is usually through the same tissue structure, following muscle preferable to penetrating the sheath. It is rapidly destructive in action. Tissues early become necrotic and, when able to free the gas formed, emit a characteristic offensive odor. This organism progresses most rapidly under sealed dressings or when the outlet is reduced to a minimum. Its presence in the uterus after expulsion of the conception, when the fundus is large and the muscle weak, the cervix rigid and the os nearly closed, finds conditions favorable for its workings. The broad ligaments, loosely constructed as they are, become most suitable for contact progress. Here also the systemic involvement may be easily induced by the entrance of the bacilli or its gas products into the circulation.

REPORT OF CASES.

CASE I.—Colored woman. Aged thirty. Pregnant at term. Had been in labor four days. Four doctors individually and collectively had attempted to assist her delivery at different intervals during this period without success. I removed a dead child by abdominal hysterotomy. The delivery of the child was accompanied with an expulsive discharge of offensive gas. Patient died two days later. No bacteriological examination.

CASE II.—History of probable miscarriage of three months' fetus ten days before admission. Six days after miscarriage she experienced chilly sensations; temperature 99 to 101. I found what seemed to be a very sick woman. Slight abdominal (pelvic) soreness but little distention; nauseated and vomiting; mental dullness with a desire to be left alone; rapid heart action (120); and rapid

breathing (40); the skin surface of waxy pallor; temperature 99. The absence of any pelvic mass failed to gain from me any indication for operation. She grew continuously worse and puzzled me to explain the cause for the apparent gravity of her condition. For two days rest, stimulation and elimination were adhered to without gain for the better. Diffuse resistance was evidenced upon vaginal examination two days later and I took this to point my duty for vaginal exploration. Free incisions posterior to the cervix permitted general separation of the tissues without entering the peritoneum, and from this opening a large amount of gas escaped with force and noise. A very small amount of serous fluid escaped. Exploration of the peritoneum showed edema of the structures of the tubes with a fibrinous exudate over their surfaces and that of the uterus. Liberal gauze drainage was placed *in situ*, but no other local treatment. The patient grew steadily worse and perished two days later. Incomplete bacteriological determination.

CASE III.—This case was a neighbor in the ward to Case II. Four days previous to operation on Case II, I removed her tubes which were filled with pus. She started to go wrong two days after her neighbor was operated upon and perished four days later, exhibiting almost identically the same clinical picture as the second case. Postmortem examination found considerable gas in the tissues. I did not operate on her for this condition as I failed to find any physical evidence that, to my knowledge about this, justified such a course. The oncoming of rapid heart action, frequent breathing, bleached mucous surface (both patients were black) abdominal distention and a postmortem revelation of gas in the tissues with no free pus, tells pretty clearly the condition of the infection. There being no gas in the tissues when I operated for removal of the tubes, the probabilities of conveying bacilli aerogenes capsulatus infection from Case II by dressings or other practices of the wards justify me in assuming that the patient received her infection in the hospital.

CASE IV.—A young white girl, twenty-one, induced a miscarriage of a three months' gestation. I saw her in consultation six days afterward with her physician who had made frequent vaginal examinations and one attempt at curettage. I found a desperately ill patient with pulse 130, respiration 38, temperature 102, and little color in the lips or skin. The abdomen was slightly distended and tender only to a small degree. I suspected from the marked pallor that serious hemorrhage had been early present but this was disproved. A very offensive vaginal discharge was present. Vaginal examination showed no circumscribed abnormality. She was transferred to the hospital and cared for by stimulation, proclisis and local cold to head, heart and abdomen. No indication for operation was accepted. She apparently held her own for three days when vomiting added to her increasing distress. She became very apprehensive, was oppressed and collapsed from which she made a partial rally under forced stimulation. Accepting this as a possible rupture of an unrecognized pelvic abscess the culdesac was opened. A force of gas escaped as the tissues were incised, some serum, but

no free pus. She perished some hours later. Cultures from the incision showed large quantities of bacilli aerogenes capsulatus.

CASE V.—Italian woman, twenty-three, pregnant beyond time was sent hurriedly to the hospital after her physician and a midwife had observed her unsuccessful attempt at self-delivery for two days and a night. When I saw her she was extremely distended. A tympanitic percussion note was present over the entire pregnant uterus. She had been referred to me for Cesarean section—at least for a delivery that could not be gained by the help that had preceded. I was somewhat at a loss to explain the significance of this tympanitic tumor, but the evident pregnancy directed my course for her relief by delivering the child. The head was engaged and seemed to be impossible of unassisted egress. Instrumental delivery was effected, but as soon as the head was free the expulsion of gas was manifest with a loud report and a force that staggered me from my position. It at once suggested to me the nature of the infection. A culture was taken which afterward confirmed my suspicion. Treatment was inaugurated upon the assumption that the infection was due to anaërobic organism. Frequent uterine irrigation of peroxide of hydrogen was established and continued. The outlet was kept open from which gas possessing an offensive odor was emitted. The surface, including the uterine cervix, vaginal vault, and a small part of the bladder wall at the fundus, sloughed away. The patient recovered.

Cases I, II, and III lack in bacteriologic confirmation. Stab cultures produced air bubbles in cases II and III but the recognition of the bacillus aerogenes capsulatus organism by a competent bacteriologist was not obtained. The presence of gas in the tissues would seem diagnostic and certainly this, supported by the marked similarity in the course of the disease and nature of infection, would justify the cases being classified as gas-sepsis. I confess my ignorance of the special cause of trouble when treating these early cases. I had no suspicion that I was dealing with the gas-sepsis until gas exuded from the incision. I was not fortified with proper understanding of the organism nor the means to combat its workings. When meeting the fifth case, it was different. The infection was recognized and I set out at once to treat the patient as if it were bacillus aerogenes capsulatus infection. Bacteriologic examination confirmed my suspicion. The patient recovered. This was the only case that did recover and I attribute the recovery not only to the free use of oxygen-giving agents and the liberal exposure but also to the early period of the disease when treatment was established.

Symptoms and Diagnosis.—The one characteristic symptom is emphysema of the tissues. This is associated with blebs and discoloration of the skin. Where the infection is in the extremities or

near the surface, this is quite noticeable; but in cases of uterine infection the progress is through the broad ligaments and adjacent tissues, which are not visible, and the infiltration of gas is not easily determined without exploration. The vaginal discharge is dark, thin and syrupy, possessing an odor quite suggestive to one familiar with it and this serves a positive factor in the diagnosis. The vaginal surface is swollen and pale—even ashy hue. The uterus is not necessarily much enlarged though soft and slightly limited in its motion. There is no distinct circumscribed neoplasm but late a diffused increased resistance becomes apparent. The abdomen is distended with increasing soreness, yet not in proportion to the apparent sickness of the patient and but little if any pain is complained of. The extreme sickness of the patient is advanced stages is alarming. This seems out of all proportion to the physical findings and perplexing to explain. The rapid heart (quickly going to 120 or 130), frequent breathing (reaching 50 to 60), the waxy pallor, oftentimes a low grade of temperature (99, 101), with the mucous membrane bleached, is the picture common to my observation. This description refers to advanced condition. The skin is much like that of pernicious anemia, though not so yellow. The last stage is delirium with dyspnea and high fever records the end. The finding of the bacilli in the discharges or the blood confirms the diagnosis.

Prognosis.—Dobbins,(5) whose observation of gas-sepsis was the first reported, states regarding his case, “that gas bacilli had been found in the tissues of the fetus and placenta, so a fatal prognosis was given to her husband.” This case was reported in 1897 and will convey the general hopelessness of the infection as viewed at that time. Little(6) reports ten puerperal cases in 1910 in which bacilli *aerogenes capsulatus* were found. Only three (including Dobbins’ case) died—mortality of 30 per cent. Little elucidated the fact that the presence of bacilli *aerogenes capsulatus* in the puerperium does not necessarily mean a diseased process. He further makes clear, by contrasting his fatal cases with those of recoveries, that when an active process becomes progressive it portends a fatal issue. The condition is primarily a local one and as such is favorably amenable to treatment, but when it becomes general in its invasion hope of recovery gives way to gravest apprehension. Reports of gas-sepsis previous to 1910 were uniformly fatal, since then the reports of recoveries have exceeded the fatalities. This is no doubt due to the recognition of light local infection by bacterial examination and early combative treatment.

The bacilli aerogenes capsulatus infection of the extremities is met with confidence. Here the whole infected area can be removed. Blake and Lahey's(7) contribution of their observations, study and experience in treating these cases has served a great help to surgeons and pointed a way to save many lives that otherwise would have perished. Amputation of the infected area, free open wound and liberal supply of oxygen and oxygen-giving agents permitted them to report 60 per cent. recoveries of their ten cases in 1910. Hewitt(8) reports 30 per cent. recovery of ten cases detailed in 1911. The three recoveries followed the institution of Blake and Lahey's plan of treatment. Klotz and Holtzman(9) collected in 1911 from the surgical services of Mercy Hospital, Pittsburg, a series of thirty-six cases of infection of extremities and give 60 per cent. recoveries. The prognosis of advanced cases of the infection in the puerperium is extremely grave, but not hopeless, and with an intelligent understanding of the nature of the infection may be considered in a hopeful manner.

Treatment.—The organism of gas-sepsis is anaërobic and upon this rests the basis for special treatment. Although this organism may accommodate itself to other circumstances it thrives best and progresses more rapidly free from air or oxygen. To supply either of these elements is to antagonize the infection. When gas-sepsis is suspected, the tissues should be laid freely open and the nests liberally exposed to the air. The application of oxygen adds additional help in opposing the septic process. Lahey and Blake(10) have successfully applied this principle by using free oxygen or hydrogen dioxide into the infected field. Lahey(11) has experimentally blocked the infection by instilling hydrogen dioxide into the tissues approximal to the field of infection, but considers this too dangerous to practise in the human subject. Dioxygen is a convenient agent and promises efficiency not only in the oxygen-giving properties but also in the dissolution of the necrotic tissue, thereby cleansing the surface from this objectionable material. I have had no experience with either the serum or vaccines of this organism, neither do I learn of others who have. The use of either does not commend itself to me in the class of cases here considered. Rest, elimination, support, stimulation and possible dilution of the sepsis is applicable to the treatment of gas-sepsis, but in addition to all this the most important is free exposure of the infected field and a bounteous supply of air and oxygen. The fight is still more effectual by the removal of the necrotic tissue and by so doing removing nests of bacilli.

Puerperal infection due to the activity of bacilli aerogenes capsu-

latus is evidently not so rare a condition as first seems apparent. Lendenthal(12) has shown the presence of the bacilli in the vagina without the presence of gas or other pathogenic effect. Welsh(13) tells us it is frequently an inhabitant of the intestinal tract of mammals and it has been found in ischiorectal abscesses. The close proximity of the rectum and vagina makes the transportation from the intestinal outlet to the vaginal inlet a rather easy communication. This is greatly facilitated by the examining hands in the presence of bowel discharges. In two of the five cases in which Welsh(14) recovered the bacilli aerogenes capsulatus organism from dead fetuses *in utero*, the puerperium was followed by an apparent normal course. Welsh (15) asserts that in the majority of cases of gas-sepsis there has been some operative interference, such as criminal abortion, forced delivery or the manipulation of an unskilled mid-wife, preceding infection. The cases cited support this assertion.

It is apparent that there have existed many mild forms of gas-sepsis unrecognized which have followed a favorable course, and yet the extreme serious nature of the cases here reported prompt me to view any suspected case with concern and caution. These experiences emphasize the importance of gaining early recognition of the infecting agent. It is important to have bacteriological examination of the discharges early in the course of trouble. If one waits until gas formation be detected before establishing specific methods to fight the infection, the procrastination will likely prove fatal. In suspicious cases seen late in the progress of the disease, I am convinced that it would be judicious to establish local treatment as if gas-sepsis were present. Should the infection not be due to the bacilli aerogenes capsulatus organism the treatment would be benignant if not beneficial; while should it be due to this agent, the need for its establishment would be imperative and delay would make recovery less probable.

The presence of this organism may not be suspected until its ravages have extended beyond control, unless one be on his guard and consider well its possibility in his observation. The apparent infrequency of its recognition, judging by the paucity of reference in the current literature, has not established so liberal a consideration as its importance deserves. That it exists much more frequently than what we are led to think I am convinced, and certainly the rapid and certain pace by which it destroys the host, if its course is not defeated, commands a broader and more general dissemination of the knowledge concerning the character of its working in order

that it shall be early recognized and effectual treatment be not delayed.

Conclusion.—The possibility of infection with bacilli aerogenes capsulatus during the puerperium is prevalent and its existence is a grave menace to the life of the woman. The seldom recognition of this special infection is out of all proportion to its existence and permits the sacrifice of maternal lives that might with an understanding be otherwise saved. The free exposure of infectious nests and liberal treatment with oxygen-giving agents promise, and have proven, efficient means to successfully fight the affection.

To help awaken an interest in this special form of infection, in order that a general recognition of its probable prevalence be gained and methods be better known whereby fewer lives shall in the future be claimed by the malignant influence of the organism, is the purpose of this paper.

REFERENCES.

1. Welsh, W. H. *Johns Hopkins Bull.*, vol. vi.
2. Klotz and Holtzman. *Journal Inf. Dis.*, vol. ix.
3. Welsh and Nuttal. *Johns Hopkins Bull.*, 1892.
4. Lahey. *Journal. A. M. A.*, 1909.
5. Dobbins. *Johns Hopkins Bull.*, vol. viii.
6. Little. *Johns Hopkins Bull.*, vol. xvi.
7. Blake and Lahey. *B. M. and S. J.*, 1910.
8. Hewitt. *J. A. M. A.*, 1911.
9. Klotz and Holtzman. *Journal Inf. Dis.*, vol. ix.
10. Blake and Lahey. *B. M. and S. J.*, 1910.
11. Lahey. *Boston M. and S. J.*, 1909.
12. Reported by Welsh. *Johns Hopkins Bull.*, vol. vi.
13. Welsh. *Johns Hopkins Bull.*, vol. vi.
14. Welsh. *Johns Hopkins Bull.*, vol. vi.
15. Welsh. *Johns Hopkins Bull.*, vol. vi.

DISCUSSION.

DR. MAGNUS A. TATE, Cincinnati.—I would like to hear Dr. Morris discuss this paper, because he reported a case of infection from the gas bacillus some years ago.

DR. ROBERT T. MORRIS, New York City.—There is not much to be said about it. We are apt to be misled by gas-forming bacilli, and I am glad Dr. Marvel has put on record the occurrence of these cases in this connection, showing we must be watchful for the presence of capsulated bacilli.

DR. MILES F. PORTER, Fort Wayne.—I have had one case of gas bacillus infection, following what I presumed to be a clean operation, a nephropexy. The woman made a recovery after opening the abdomen. We had no intraabdominal trouble *per se*, but the peritoneum over a foot of the intestine was underlaid with bubbles of gas. We drained, and she ultimately made a recovery.

OMENTOCOLOPEXY.¹

BY

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THE operation termed "omentocoloexy" was designed by the author for the purpose of forming a support for the dropped transverse colon, hoping thus to cause the angulations at the hepatic and splenic flexures of the gut to be less acute, with consequent relief of symptoms due to colonic irritability and stagnation.

If successful, this simple operation should, in many cases, obviate the necessity of subjecting patients to the more radical operations of resection and anastomosis.

The author has thus far performed the operation on but four cases. While the results have been sufficiently encouraging to lead to a continuation of the work, the small number precludes their use for statistical purposes. The operation is, therefore, offered as one of probable utility, its value to be determined. *x*-rays were taken of the cases previous to operation, and it is intended to ray them again after sufficient time has elapsed to determine if permanent mechanical results have been obtained.

The operation consists of uniting portions of the great omentum to the parietal peritoneum and the subperitoneal aponeurosis in such a manner as to raise and support the dropped portions of the colon. This is accomplished by introducing and suturing, through punctures in the peritoneum and aponeurosis, one or more small button-shaped masses of the omental tissue, selected and formed at points near the parts of the colon requiring suspension.

The operation may be made through any abdominal incision from which the points of suspension can be reached. The *x*-ray findings, which should be obtained with the patient in the erect position, will indicate the degree of ptosis of different sections of the gut and the points requiring suspension.

The technic is as follows: After opening the abdomen, breaking up adhesions, and doing any other necessary intraabdominal work, the sections of colon to be suspended are noted, and at a point about

¹ Read before the Twenty-sixth Annual Meeting of the American Association of Obstetricians and Gynecologists at Providence, Rhode Island, September 16-18, 1913.

two inches from the gut, at each section, a small portion of the omental tissue is grasped with tissue forceps, including the entire thickness of the membrane, and, with a few stitches of Pagenstecher linen, a pea-sized button is made of a part of the tissue held up by the forceps, the thread being left with both ends long. There may be one, two, three, or four of these buttons, according to the length of gut to be suspended. The sections of omentum thus secured should be from 3 to 4 inches apart, to preclude the possibility of strangulation of any viscera which might pass between them. The buttons of omentum are then fixed by drawing them through a puncture in the peritoneum and subperitoneal aponeurosis by means of a long curved ligature carrier (Barrett's). This is thrust in from the abdominal incision, carried along above and parallel with the aponeurosis to the point desired, then turned, and the dull point forced through the aponeurosis and peritoneum. The jaws are then opened to enlarge the puncture, the suture ends of one of the portions of omentum grasped, pulled through, and with it the button of omentum, which is then sewed fast to the aponeurosis in this position by the suture attached to it. Each button of omentum is treated in a similar manner, placing them in such positions as will best serve their purpose of suspension. The advisability of closing the gaps between the fixed portions of omentum by suturing the intervening omentum to the parietal peritoneum has occurred to the author, and it is his intention to do this in future cases, as this would make the fixation stronger, and would preclude any possibility of the incarceration of other viscera between the fixed points. Made in this way, the stomach would also be supported, as in Coffey's hammock operation the technique of article was not known to the author previous to the performance of his "Omentocolopexy."

271 WOODWARD AVENUE.

DISCUSSION.

DR. J. H. CARSTENS, Detroit.—I would suggest that Dr. Longyear, when he publishes his paper, also publish with it those x-ray pictures. They would make the text clearer and show what can be done.

DR. LONGYEAR (closing the discussion).—The operation is of value in preventing readhesion of old adhesions which have been broken up. In cases of Jackson's membrane where the gut has been pulled down into angulation, where adhesions are broken up, and readhesion is likely to occur, they can be cared for by this method. It is of value in these and similar cases, as well as when used for the relief of coloptosis.

THE TRAINING OF THE AUXILIARY EXPULSORY MUSCLES OF LABOR.¹

BY

GREER BAUGHMAN, M. D.,

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IN this age of preventive medicine, it behooves the obstetrician to take his stand upon the side of preparation of the girls in such a way that their accouchement when they become grown will be attended by less dangers and to remedy the natural consequences of the labors in such a way that future pregnancies will be attended by less pain and will be accomplished with greater ease.

Lister and his followers up to our time have robbed the lying-in bed of one of its dangers—sepsis; but there are other dangers that may be annihilated.

In labor we are dealing with a problem in mechanics. Unless the child is too large to pass through the pelvis, or unless it is in such a position that it cannot pass through because of its faulty position, then the only problem that confronts us is the force of the mother's muscles propelling the child onward and the relaxation of the perineal muscles that retard the egress of the infant.

This paper does not deal with the uterus or with the opposing perineal muscles, but alone with the auxiliary striated skeletal muscles. By intelligent training of these auxiliary muscles in girls, by the conservation of their strength during pregnancy and by the proper handling of them after delivery, the state of labor can be made much safer and the condition of pregnancy can be made much more attractive to our women.

The auxiliary muscles which have nothing to do with the dilatation of the cervix, but which aid in the expulsion of the child are:

1. *The Diaphragm*—arising from the whole inner circumference of the thorax, being attached in front by fleshy fibers to the ensiform cartilage and on either side to the inner surface of the cartilages and bony portions of the six or seven inferior ribs and behind to two aponeurotic arches and to the lumbar vertebræ.

2. *External oblique*—arising by eight fleshy digitations from the

¹ Read before the Twenty-sixth Annual Meeting of the American Association of Obstetricians and Gynecologists at Providence, Rhode Island, September 16-18, 1913.

external surface and lower borders of the eight inferior ribs and inserted into the anterior half of the outer lip of the crest of the ilium, tendinous fibers opposite a line drawn from the prominence of the ninth costal cartilage to the anterior superior spinous process of the ilium.

3. *Internal oblique*—arising from the outer half of Poupart's ligament, from the anterior two-thirds of the middle lip of the crest of the ilium and from lamella of the lumbar fascia and inserted conjointly with the transversalis into the crest of the os pubis and pectineal line, into the linea alba and the cartilages of the seventh, eighth and ninth and into the tenth, eleventh and twelfth ribs.

4. *Transversalis*—arising from the outer third of Poupart's ligament, from inner surfaces of the cartilage of the six lower ribs and from the spinous and transverse processes of the lumbar vertebræ, inserted into the lower part of the linea alba, the crest of the os pubis and pectineal line, into the linea alba.

5. *Rectus abdominalis*—arising from the crest of the os pubis and symphysis pubis, insertion into cartilage of the fifth, sixth and seventh ribs.

6. *Pyramidalis*—arising from front of the os pubis and anterior pubic ligament and terminating in the linea alba.

The muscles are mesoblastic in origin and develop by the elongation of the original embryological cells with the multiplication of the nuclei. The unit of the muscle is the muscle fiber, the longest of which, according to Felix, is 12 cm. with a width varying from 0.013 to 0.019 mm. The fibers that have a wide variation in utility are long, while those for strength alone are short and thick. The absolute force of a muscle is in direct proportion to the number of fibers and to their length. Weber has shown that a muscle will contract 47 per cent. of its resting length.

Striated muscles are but poorly reproduced after destruction but recent investigation has shown that muscular fibers are destroyed and do grow during the life of an individual. Schaffer had suggested that there is a formative tissue between tendon and muscle substance, from which, on the one hand, muscle fibers are developed, and, on the other hand, connective tissue and cells are formed. The loss of muscle substance is replaced by new elements developed from free sarcoplasm, which is characterized by rapid growth, and increase in number of the nuclei. These are called myoblasts.

The lack of exercise causes the development of fibrous connective tissue and fat between the muscle fibers.

According to McKenzie, by repeated contraction the muscle cells

increase in size and number, the perimysium is strengthened, the fibrous wall surrounding the bundle of cells is invigorated, and fresh power is imparted to the sheath inclosing the entire muscle. The result is an increase in bulk, in strength and in elasticity.

The absorption of carbohydrates and proteids by muscular exercise causes a hunger for food just as the using of oxygen produces hunger for air. Socrates said of exercise: "The strength of the body is destroyed by violence and idleness but preserved by exercise."

Undoubtedly the uterus itself is sufficiently powerful to expel a fetus, but if the striated muscles are well developed and put to the proper use by the woman, then the termination of her delivery should be more prompt.

The first proposition is to train the abdominal muscles so that they may be ready when the time of need arises. I think this training should be begun while the girl is thirteen or fourteen years old, depending upon the state of her development, and I hold that this training should be systematically carried out by trained teachers after a careful physical examination of the girl has been undertaken by a physician trained in physical exercise work, so that girls that might be injured by the regular exercises can be given modified exercises.

In addition to the regular general gymnastics the series of exercises described now have proven in my hands most effective in the training of the abdominal muscles.

First Exercise.—Lie upon the floor or bed with shoulders back, chest out and whole body fixed rather rigidly, raise the right leg slowly until it is perpendicular to the trunk and slowly bend at the knee, allowing the leg slowly to descend upon the thigh and then to be slowly extended. This is done three times with one leg, three times with the other and then three times with both together: After several days or, in the discretion of the trainer, the following exercise is added.

Second Exercise.—Same position of the body. The leg is lifted from the bed until it is perpendicular to the body; it is then brought down slowly until it lies parallel to the other leg. This is done three times with one leg, three times with the other leg, and three times with both together. After several days or in the discretion of the trainer the following exercise is added.

Third Exercise.—Exactly like the second except the leg is brought almost to the bed and from that suspended position is raised slowly to perpendicular to the body. This is done three times with one leg, three times with the other, and three times with both.

Fourth Exercise.—The feet are fixed underneath a bar in the bed, the shoulders held back as in the other exercises, the body is bent at the waist with the chest forward, brought up bent forward until the thighs are touched, and then allowed slowly to fall back in place. During this exercise the glottis should be open. This exercise is done three times.

Fifth Exercise.—In an erect position, chest forward, shoulders back, hands on hips and with the feet stationary, the body is rotated slowly to the right with the pelvis as an axis around which it turns. The body is then brought back with the chest and abdomen to the front. The next rotation is made to the left side with the return of the chest and abdomen to the front as in the first exercise. This exercise is carried on five times or as often as the instructor deems advisable.

After the women are impregnated I explain to them why I am anxious to preserve the tone of their abdominal muscles and then give them instructions in masseuring their muscles. After the uterus has become sufficiently large to distend the abdomen, they are fitted into corsets that tend to hold the uterus up and at the same time they are instructed to begin masseuring at night. It seems to me a bad practice to support the uterus without giving the abdominal muscles massage, because the less a muscle has to do, the less it will do. If the abdomen cannot be held up comfortably after the uterus has gotten larger then they put on a Scultetus bandage or some other sling to hold it up and prevent stretching of the muscles. During this period the abdominal muscles are massaged.

After delivery they have placed upon them a snug fitting bandage with a pillow around the fundus, which presses the fundus forward. When the uterus disappears the pillow is removed. After the patient has gotten out of bed, the nurse is instructed to massage the abdominal muscles once a day. When the woman is strong enough she attends to the massage herself.

At the end of six weeks she is examined and, if subinvolution is complete, she is instructed in the series of abdominal exercises described in the first part of this paper and allowed to practise them until it appears that the muscles have regained their tone.

If the woman can be shown that by a systematic care and exercise of the abdominal muscles she can avoid a great deal of backache, she can regain her figure and the carriage of her body, then pregnancy will have been robbed of some of its most serious drawbacks and many women will enter into that state with more hope and pleasure.

There are many women who dread the pregnant state, not because

of the discomfort incident to the carrying of the child and its delivery, not because of the trouble that the raising of the children gives them, but because so many of their friends have dated their loss of youth, both in appearance and in feeling, from their delivery.

Let us train our girls to be mothers and our mothers to retain their girlish appearance and feelings.

LUMBAR AND SACRAL BACKACHE IN WOMEN.*

BY

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Washington, D. C.

CONSTIPATION and backache are the two most common symptoms complained of by women. "Backache" like "biliousness" is such an indefinite term that it does not appear in many of our leading text-books on diagnosis and practice, and yet, it is present in nearly all of our cases of pelvic disease, and is the term employed by everyone to denote pain in the lumbar and sacral regions.

It is the object of this paper to enquire into the causes of backache in women, and the paths by which the stimuli travel in reaching their destination. While the whole dorsal region or any portion thereof may be the seat of pain, it is only that found in the lumbar and sacral regions that will be considered, as it is here we get so much of the discomfort associated with diseases of the pelvic organs. We must remember, however, that many conditions other than those of the pelvic organs cause this backache, and that they often act conjointly. These nonpelvic backaches are frequently mistaken for those of pelvic origin, and lead to unnecessary or unnecessarily prolonged treatment of these organs.

Disease of the brain and spinal cord, of the nerves, and the acute and chronic intoxications that affect other structures at the same time have no place in this discussion, as the symptoms referred to these regions are usually but a minor complaint.

Anatomy of the Parts Involved.—The two important muscles of this region are the sacrospinalis and the multifidus spinæ which occupy and fill the spaces from the transverse processes of the lumbar vertebræ and the posterior surface of the sacrum to the superficial portion of the deep fascia.

The various ligaments holding the vertebræ together, those holding the pelvis to the spine, together with those of the posterior portion

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of the pelvis are associated not infrequently with backache as we shall see later.

The muscles as well as the skin of the lumbar and sacral regions are supplied by the posterior divisions of the lumbar and sacral nerves.

Roughly speaking, the blood supply of the lumbosacral region comes from the lumbar arteries and branches of the internal iliac, all of which anastomose freely with the arteries of neighboring regions. With the arteries come, of course, sympathetic nerves from the aortic, hypogastric and pelvic plexuses and in this way one channel of communication through the sympathetic is established between the pelvic and lower abdominal organs with the muscles and skin of the back.

The sympathetic system plays almost the only rôle in the innervation of the pelvic organs. The only direct connection between these organs and the spinal cord is through the white rami communicantes of the pelvis; these leave the anterior divisions of the second, third and fourth sacral nerves and go directly to the pelvic plexuses, without connection with the ganglionated cord. These fibers are the axons of cells in the spinal cord and are efferent in action, sending impulses from the central nervous system to the viscera by means of the plexuses.

The afferent fibers pass from the viscera to the cells in the ganglionated cord and thence by the gray rami communicantes to both primary divisions of the spinal nerves; here they send fibers not only to both horns of the cord but also send fibers of distribution accompanying the anterior and posterior primary divisions.

From this we see that the lumbosacral region is supplied by somatic nerves from the posterior primary divisions of the spinal nerves and by two sets of sympathetic fibers, (1) from the ganglionated cord through the gray rami communicantes and the posterior primary divisions and (2) from the aortic plexus by fibers accompanying the branches of the abdominal aorta and from the hypogastric and pelvic plexuses through branches of the iliac arteries.

Attempts have been made to differentiate between the pain in the somatic and sympathetic nerves, but to us it seems to be impossible. Among the common symptoms found in viscera supplied by the sympathetic are a feeling of weight, fullness or constriction, burning, sensations of heat and oppression, and very often there is tenderness. These sensations are seldom circumscribed and are situated in the region of the organ itself. In acute inflammations and involuntary

muscle spasm all grades of sharp pain are felt. From these organs stimuli are sent out by the tracts already mentioned, to the various portions of the body most nearly connected with it, and as the stimuli increase in volume and persistence they overflow these paths and new areas not usually involved are the seat of referred pain.

Anatomical Causes of Pain in the Back.—Faulty footwear, such as too high heels or heels placed too far forward under the foot, flat-foot, subluxation of the sacroiliac joint and prolonged stretching of the ligaments of the lumbar spine and those from the spine to the pelvis, which occur in those who work or sit long in faulty positions are some of the causes in this group, and no attempt has been made to locate the exact position of their referred pain. Under certain conditions displacements of the uterus will act as a cause.

Pelvic and Abdominal Reflex Pain in the Back.—These referred pains in the back may be only a hypersensitiveness of the skin, or a dull or sharp ache, or a burning, pricking or soreness. Two or more of them may be associated.

The paths by which the stimuli reach the back have been mentioned, and are usually from the pelvic viscera to the pelvic plexuses, thence to the ganglionated cord or direct to the posterior divisions of the lumbar or sacral nerves, thence to the surface. The connection between the plexuses of the different organs is so intimate that the referred pain from each organ has practically the same location. The ovary may form an exception, for it derives its nerve supply not only from the branches of the hypogastric plexus but chiefly from the renal plexus which follows the ureter and ovarian vessels. Its connection with the spinal nerves being so much higher in the back may place the seat of referred pain in the upper lumbar region. The other pelvic referred pains are usually found over the sacrum where the posterior branches of the sacral nerves are distributed.

Physiological Causes of Pain in the Back.—The simplest form is that seen when the sacrospinalis and multifidus have been overworked, in which case the ache is due to the products of muscle metabolism. The same kind of pain is also found in those who sit for some time too far forward on the chair with the scapulæ resting on the chair back; this leaves the lumbar region unsupported and overstretches the muscles, fasciæ and ligaments of the spine. Similar effects are produced by working over a low wash-tub or sink, or sitting in a low chair bending far down to do fine sewing.

In these cases the pain is in and on the lumbar portion of the large spinal muscles and should not be confounded with the sacral pain

from pelvic disease. This is the point we wish to emphasize, and we believe if this is born in mind and trouble be taken to differentiate these forms of pain, that much time will be saved the physician, and the patient will be relieved of much worry and expense.

TREATMENT OF UTERINE RETRODISPLACEMENTS IN PREGNANT AND NONPREGNANT WOMEN.*

BY

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IN choosing the title of this paper, I have done so, not with the idea of presenting anything new, but because I have been fortunate enough to have a good many of these cases to treat, and knowing that there are so many different treatments, I have often wondered if the treatment that I gave was the best for the patient. Feeling that I will be enlightened on many points, and hoping to bring out some facts of interest, is my only excuse for imposing on your patience for a short time.

I will take up first the treatment of retrodisplacements in non-pregnant women, and will only consider those which cause annoying symptoms to the patients, and eliminate describing the different degrees. The treatment may be divided into medical or local, and surgical or operative.

The former, which consists of application of astringent drugs, wearing of pessaries, and tampons, many forms of electrical treatment, postures, bimanual massage (which is very agreeable to some women) is lauded by unscrupulous practitioners. I think, with the exception of the acutely retrodisplaced uterus, caused by some indirect violence, the above forms of treatment are productive of nothing but temporary relief to the patient.

It is indeed hard to realize how many women are being treated by some of the above methods, and how many physicians are using these

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treatments, with apparently a clear conscience, when they tell the patient she is better to-day than yesterday, and to come back to-morrow or the day after.

I cannot conceive of a retrodisplaced uterus, with the relaxation of the ligaments, that causes annoying symptoms, being cured by any of these methods, and all that can be done is to give temporary relief of body and mind and build up the patient for the more radical treatment that will effect a cure.

Even if we do sometimes cure the patient by using tampons and pessaries and positions, over a long period of time, is it not best and quicker to proceed with the operation of shortening the round ligaments, which will produce a quicker and surer cure and only inconvenience the patient for two or three weeks, than to keep them under this local treatment for maybe months and years?

SURGICAL TREATMENT.

I will not attempt to describe the different methods in detail, but will mention those that have been and are most used to-day. The first and most popular was the Alexander extraperitoneal operation which was first done by him on December 14, 1881. The idea was conceived several years before by Alquié of France, who operated on animals, but never on a human being. De Neffe had also anticipated this method and operated unsuccessfully in 1864 on a living woman.

This method of operation is applicable to such few cases, and as it takes more time and is not so sure as the internal operations, it is very seldom used at the present time. The objections to this method are the time, the difficulty of finding the ligaments, the likelihood of rupturing the ligaments by too much tension, and the difficulty of knowing just how much slack to take up in the ligaments to keep the uterus in a normal anteverted position. There have been many modifications of this method, none of which have proven satisfactory.

Goldspohn opened the abdominal cavity at the internal ring, broke up adhesions, and removed diseased appendages. His method, however, was never sanctioned by surgeons and is never used at the present date.

Wylie, Dudley, Mann, and others devised operations in which the ligaments were either folded upon themselves or stitched to the uterus, in different ways, maintaining the uterus in its normal position of anteversion.

Ferguson divided the ligaments $1\frac{1}{2}$ inches from the rectus and aponeurotic sheath to the fascia of the external oblique muscle.

Gilliam omitted dividing the round ligaments and instead sutured a loop after the manner of Ferguson. The main objection to these methods is that it divides the pelvic cavity into three segments which may allow the bowel to fall into any one of them and become strangulated or incarcerated.

Simpson devised the retroperitoneal shortening of the round ligaments. The procedure shortens and attaches the shortened ligaments to the anterior abdominal wall and leaves but a single opening into the pelvic cavity, with very slight chances for any adhesions or strangulation of the bowel. But, by lifting the uterus too near the anterior abdominal wall, it is likely to become adherent to the abdominal incision. This method I have never tried.

The operation which has given me such satisfactory results and the one which I wish to describe more fully, is the Baldy-Webster shortening of the round ligaments. C. P. Noble claims that theoretically this operation combines all the bad points of the various round ligament operations for retrodisplacement. Practically, however, this is not true, as I will try to show by case reports.

THE OPERATION.

Make a median incision $2\frac{1}{2}$ inches long, extending to within $1\frac{1}{2}$ inches from the symphysis. Pack off the intestines from pelvic cavity by tape sponges. Lift the uterus and have an assistant hold it in the position that you wish to leave it when all suturing is completed. (This, I think, is important so that the operator may know just how much slack to take up in the round ligaments.) A small curved artery forcep is then pushed through a clear space in the broad ligament on either side, about 1 inch from the lateral wall of the uterus, and under the ovarian ligament. The loop of the round ligament is then caught with a hemostat and pulled through the opening of the broad ligament (the point where the round ligament should be grasped depends upon how much relaxation exists). The loops of the round ligament are then brought together behind the uterus about the level of the internal os, sutured with No. 1 chromic gut, fine silk or Pagenstecher. Then about three interrupted sutures are passed through each ligament and the posterior wall of the uterus, so that the uterus is freely movable and hangs in a sling without any undue tension on either of the round ligaments. By this method the fundus is pulled well forward and downward from the anterior ab-

dominal wall, and I think less likely to become fixed to the incision than in any other round ligament operation.

This method is quick, only taking about fifteen minutes, there is no loss of blood or danger of bowel strangulation, and it does not interfere with pregnancy. I believe it is just as reliable, if not more so, than any other single round ligament operation.

The main objection to this method has been that we use the strongest part of the ligament and put the strain on the weakest. This is, I think, purely theoretical, as the operation when finished, if done correctly, requires no more tension on the round ligaments than the uterus does in the normal position. Of course we could not expect any round ligament operation to produce a cure with lacerations on the vaginal outlet, and before attempting any operations for retrodisplacements with lacerations on the outlet these should be repaired first.

Other Surgical Means for Retrodisplacement.—The shortening of the uterosacral ligaments is I think, a great asset in some cases, combined with the other round ligament operations.

The Ventral Suspension.—The ventral suspension which has been done for a great many years is, I think, inferior to any of the round ligament operations and should rarely, if ever, be done in a child-bearing woman, owing to the liability of the uterus to become adherent to the incision, or else forming a false ligament and attaining its abnormal position by stretching of this false ligament, which consists of nothing but peritoneum and is not capable of reacting.

Ventral Fixation has been used a great deal, but I do not believe it is ever justifiable. The interposition operation in a woman past the child-bearing age, with laceration of the perineum has, in the hands of some, given good results. This operation I have never had an opportunity to test.

CASES.

CASE I.—Mrs. S., aged thirty-three, widow, para-iii. Operated August 25, 1910, incomplete abortion. Seen by me November 1, 1911. Examination showed poorly nourished woman, irritable, pains in both lower quadrants, constipated, feeling as though her bowels were going to fall out, cervix rather low, body retroverted low down on rectum. Large cystocele and rectocele. Marked relaxation of the anterior and posterior vaginal walls. Symptoms much worse at menstrual periods. November 15, 1911, operated at Columbia Hospital, curettage, anterior colporrhaphy, perine-

orrhaphy, Baldy-Webster shortening of the round ligaments. The patient made an uneventful recovery, leaving the hospital in three weeks. Was married again and delivered of an 8-pound boy December 20, 1912. Normal birth. Only skin laceration of the perineum. March 10, examination shows uterus freely movable in good anterior position. The patient has never had any return of the former conditions and is gaining in weight.

CASE II.—Miss K., aged thirty-two, single. Severe pain in pelvis two to three days before menstruation, backache and headache for three years, sometimes nausea and vomiting, very nervous, feeling of weight in pelvis, constipated at all times. Examination. Appendages normal, vagina small, uterus small, cervix pointed toward symphysis, body backward and movable. Tampons, pessaries, douches and positions have been tried for the past two years, with no relief. Operated October 1, 1910, curettage, Baldy-Webster shortening of the round ligaments. Patient left the hospital in two weeks. Has had no trouble in menstrual periods since. Has gained in weight, and nervousness and constipation much relieved. Examination September, 1912, shows uterus in normal anteflexed position and she says she has not consulted a physician since she left the hospital.

CASE III.—Mrs. R., aged twenty-five, married, no children. Has had dysmenorrhea since puberty. For the past four years, pains at beginning of menstruation become much worse. After being married in June, 1910, symptoms were aggravated and she began to feel pressure on the rectum and a dragging sensation in the pelvis. She became nervous and hysterical each month at the menstrual period. On June 8, went to Georgetown Hospital and examination showed uterus retroverted, small, but could not be pushed up anteriorly. Appendages normal. Operation June 9, 1911, Baldy-Webster shortening of the round ligaments. Discharged June 30. Menstruation came on in July and the patient's first knowledge of it was when she saw the blood stains on her clothes. She has had no trouble with menstruation since. Has gained in weight and complains of slight pain on right side during intercourse near menstrual period. Examination October 15, 1912, showed uterus in normal position, enlargement of the right ovary and movable right kidney, which comes down to the upper border of the pelvis, but does not cause any severe pain. She refused to have it attended to.

CASE IV.—Miss C. W., aged twenty-two, single bank clerk, pale, poorly nourished and very nervous. Complained of pain in back on left side and frequent urination. Very constipated, poor appetite. Has been treated over a year with tampons, pessaries, and tonics. Examination showed uterus retroverted, cervix pointing up, left ovary large and tender. Leukorrhea profuse. Operation May 20, 1912, Baldy-Webster shortening of the round ligaments, curettage, removal of left ovary. Uneventful recovery. Examination January 18, 1913, shows uterus in normal anteflexed position, freely movable, has gained 13 pounds, and with the exception of the

first period after operation, she has had no trouble whatever up to this time.

RETRODISPLACEMENTS COMPLICATING PREGNANCY.

In this condition we must not only consider the life and comfort of the mother, but the child deserves consideration also; therefore we must necessarily use all of the milder forms of treatment, such as postures, manual replacements, and holding the uterus in position by pessaries. This treatment, however, must not be continued too long. If we get hyperemesis and constant irritation of the bladder, with pain and pressure in the pelvis, the operation should be done early.

I wish to report three cases of retrodisplacement complicating pregnancy. The first case—uterus movable and replaced and held in position by Smith-Hodge pessary; the second—uterus firmly fixed and incarcerated, which could not be replaced manually, and an operation was necessary; and the third, after a very stormy period, corrected itself.

CASE I.—Mrs. C., aged eighteen, married. Seen on May 16, 1912. Last menstruation January 28, 1912. Nausea began latter part of February and continued until April 5 with occasional vomiting. Since that time she has been unable to retain any solid food, and when seen by me she stated she had lost 20 pounds and had been living on water, very small amounts of milk and broths. Examination showed a well-developed girl, though emaciated; heart and lungs negative; urine normal; uterus the size of a large orange and retroverted, movable from side to side, but could not be lifted above the promontory or sacrum, with patient in dorsal position. Was sent to Columbia Hospital and put in the knee-chest position and the uterus was easily brought to anterior position and pessary inserted. All nausea and vomiting immediately ceased. She began to take food and in six days left the hospital, apparently well. She went to New York the following day and continued to gain in weight. Went through a normal confinement on November 10, 1912.

CASE II.—Mrs. J., aged thirty-three, married. Seen in consultation October 9, 1912. Complained of severe pain in pelvis, especially on left side, with nausea, frequent and painful urinations. On examination a large mass was felt in the posterior culdesac, and mass on the left side in the lower left quadrant. Cervix was not very soft. She stated that she had not menstruated for three months, although it was nothing for her to miss these periods, and it was a little difficult to diagnose pregnancy. Owing to the severity of her symptoms, she was advised to go to the hospital for an operation. Examination under ether revealed a pregnant, retroverted, incarcerated uterus, with left ovarian cyst. Laparotomy was done

and the uterus brought forward, and round ligaments were shortened by simply taking up a loop, much after the method of Wylie. The ovarian cyst was removed, the patient had no ill effects, and no uterine contractions afterward, but was very much disappointed to find that she was not going to abort. She left the hospital in twelve days and improved until November, when the family physician was discharged and Dr. Kemp was called in. I have been unable to get any further history except that Dr. Kemp called the family physician and said on his second visit he got there just in time to deliver the woman of apparently a three-months fetus.

CASE III.—Mrs. S., aged thirty-one, married for three years. First year had a three-months miscarriage. Second year of married life was operated on for left tubal pregnancy by Dr. Kelley. Since the operation has had irregular pains on right side. Consulted me November 15, 1912, for diarrhea of six weeks duration, insomnia, pains in the pelvis on right side, and white tenacious discharge from the vagina. Examination showed well-developed and nourished woman, heart and lungs negative, abdomen slightly enlarged, pain on pressure on both lower quadrants, some tympanites, vagina very tender, uterus normal in size, retroverted, and cervix pointing toward left fornix. She was thoroughly purged with castor oil, put on a light diet, and treated locally, with douches, tampons and given diarrheal mixtures until January 1, with very little improvement. At this time I was able to make a diagnosis of pregnancy and the local treatments were discontinued. The symptoms became more aggravated, the tenderness in the vagina and pelvis more marked, urination became more painful and frequent, nausea and vomiting continued. January 3, had consultation with Dr. Bowen and diagnosis made. Retroverted pregnant uterus. Operation not advised. She was then kept in bed and assumed knee-chest position three times a day for fifteen minutes and all the usual remedies tried for nausea, vomiting, and diarrhea, which persisted in spite of treatment. On February 14, examination showed uterus size of four-months pregnancy. Cervix soft and pointing to the left, with some uterine contractions. Body of the uterus firmly incarcerated in pelvis. Treatment continued and about March 1, uterus changed its position nearer to the median line and began to rise out of the pelvis. Symptoms began to subside and in ten days she was allowed to sit up. The improvement was steady, with the exception of a few minor complaints. She then went through an easy labor on August 6, 1912, giving birth to an 8-pound baby, and made a good recovery. Examination in October, 1912, shows uterus rather large, still retroverted, but causing no discomfort. She was, therefore, advised to be operated upon after weaning the child.

TRANSACTIONS OF THE NEW YORK OBSTETRICAL SOCIETY.

Meeting of October 14, 1913.

The President, HOWARD C. TAYLOR, M. D., in the Chair.

DR. FRANK OASTLER reported the following cases.

LARGE OVARIAN CYST.

Mrs. Annie W., age forty-six, widow, colored, had one child with a normal labor twenty-five years ago, no history of miscarriages or



FIG. 1.

serious illnesses. About sixteen years ago, patient noticed a swelling in the abdomen which a physician advised should be removed. The

patient feared an operation, however, and the swelling slowly increased in size. Her menstrual history was negative. Previous to the operation the abdominal swelling had increased to such an extent that the patient had to sleep in a chair for the last year and a half. She had irregular pains in the abdomen and the legs became gradually swollen. Dyspnea was marked and urination frequent and painful. The bowels were normal and there was no disturbance of digestion. Within the past few months a rather rapid increase of the abdominal swelling was noticed and the patient was able to walk only with difficulty. A considerable loss of flesh and strength with poor appetite and disturbed sleep was complained of, together with occasional palpitation of the heart.

The physical examination showed a much emaciated and anemic woman with edema of both legs. The pulse was 120, of poor quality, respiration 33, temperature 99.5° F. The urine showed a marked trace of albumin but was otherwise normal. The blood-count showed 3,500,000 red cells, 10,000 leukocytes, 76 per cent. polymorphonuclears. Palpation of the abdomen disclosed a symmetrical enlargement, tense, elastic and not tender, which extended well under the anterior arches and spread them well apart. The percussion note was flat all over the abdomen except in the lumbar region and over the epigastrium. There was no difference on changing the position of the patient. A vaginal examination showed a small retroverted uterus and tubes not palpable. A diagnosis of ovarian cyst was made which at the time of subsequent operation was found to be irregularly adherent to all the abdominal viscera and parieties except the uterus and ovaries which were found in a normal condition lying free in the pelvis. There were no small fibroids of the uterus or cysts of the ovaries. The cyst was tapped and removed with difficulty. The patient rallied from the operation and made a complete recovery. The pathological examination of the specimen disclosed a large thin-walled unilocular cyst which with its contents weighed 48 pounds 5 ounces. The fluid was chocolate colored and had no odor. The microscopical examination of the cyst-wall showed this to be made up of fibrous tissue with no epithelial or endothelial lining. The contents appeared to be old, altered blood. The origin of the cyst was not apparent.

SPONTANEOUS GANGRENE OF THE CERVIX.

Miss C., age twenty-one years, single, white, with nothing abnormal in the previous history. Three years ago the patient spilled some acid on the anterior surface of the right wrist which left a scar about 2 inches square. Two years ago, small vesicles appeared in this scar and gradually increased in size. The skin finally sloughed away, leaving an unhealthy raw surface which underwent further necrosis toward the edges of ulceration. The patient's general condition was good and no apparent cause for this ulceration evident. After six weeks the entire scar-tissue was involved and as there seemed to be no apparent limitation to the process, the diseased area was removed

and healthy skin taken from the thigh and used as a graft to cover the same. The grafts healed readily but the wound on the thigh very slowly, although no necrosis occurred. Microscopical examination of the diseased tissue was negative. The wound in the wrist remained healed for about eight weeks and then a repetition of the same condition occurred. Operation was again resorted to and a transplanted segment of skin to cover the raw surface. This healed and remained so. Five months later the patient noticed a similar area of necrosis over the crest of the left ilium in a small scar following an injury by a corset steel, several months previous. This wound healed slowly after about six months of treatment. The patient then began to complain of vaginal discomfort and a disagreeable discharge, otherwise her health was good. An examination showed the presence of several small vesicles, with similar area of necrosis as those found in the skin, on the cervix and extending into the anterior vaginal fornix. Notwithstanding the application of various drying powders, the process spread over the most of the cervix and anterior vaginal wall. The resulting ulceration became finally healed and remained so. The microscopical examination of the sections taken from the ulcers showed areas of necrosis with degenerative changes in the blood-vessels. A Wassermann reaction was negative and likewise the urine and the blood. Such cases of spontaneous gangrene are rare and in this instance nothing was found to explain the condition.

ECTOPIC PREGNANCY WITH DIAGNOSIS OF INCOMPLETE
INTRAUTERINE ABORTION.

Mrs. S. W., age twenty-eight years, with a negative previous history. Her first labor was normal and regular menstruation was resumed six weeks after weaning. The patient went two weeks beyond term and thinking she was pregnant tried to induce an abortion. Bleeding commenced in twenty-four hours and a dull pain in the lower abdomen was noted about forty-eight hours later. The bleeding continued for five days when the patient came under Dr. Oastler's care. At that time she complained of discomfort in the lower abdomen and stated that since the effort to induce abortion she had become constipated, a condition from which she had never before suffered. There was no nausea and no increased frequency of micturition. Examination of the abdomen was negative and no tenderness could be elicited. Vaginal examination showed the uterus somewhat enlarged and soft, with the cervix normal. Ovaries and tubes were apparently normal and a diagnosis of incomplete abortion was made. The patient was curetted but nothing was found and she continued to flow but had no pain. Not having bled for five days, the patient was again examined and the results differed from the preceding one in only a single respect, a small mass was felt in the right lateral fornix which was hard, movable and appeared like an ordinary cystic ovary. With the history of a missed period, negative curettage, sudden onset of constipation, slight general pain, continued bleeding

notwithstanding curettage, and a small mass not found on first examination, a diagnosis of incomplete ectopic gestation was made. The operation revealed this condition in the right tube with a small amount of blood around the fimbriated extremity. There were no adhesions present and the corpus luteum was not found in the left ovary. The right ovary was very small and apparently atrophied. The interesting feature in this case was the misleading history and physical signs.

DISCUSSION.

DR. ROBERT F. FRANK stated that although he had never had a case of spontaneous gangrene of the cervix, he did have the opportunity of seeing the after-effects of such a condition. The patient was a young woman who was admitted to the hospital with a ruptured ectopic. A laparotomy was done and the gestation sac, including the tube, was removed. The patient made a good recovery until the tenth day when a rise of temperature occurred. A very complete history from the previous operator was obtained. After the patient had been admitted to Dr. Brettauer's service at Mount Sinai Hospital, a foul discharge had appeared which was found to be due to a gangrene of the cervix. During the operation or afterward there had been no vaginal manipulation or interference and no attempt at criminal abortion had been made. The gangrene was therefore apparently spontaneous although the case was not exactly similar to that described by Dr. Oastler. Dr. Frank stated that one of the most interesting features of the case was as follows: The patient came to Dr. Brettauer on account of a hematometra which had developed a scar formation resulting from this gangrene and sloughing of the cervix. Dr. Brettauer performed a plastic operation on the cervix which at the time looked very promising but the patient since then again developed similar symptoms and very possibly a hysterectomy will prove necessary. Dr. Frank referred to the technical difficulties in such operations and stated that they had had three cases at one time at Mount Sinai Hospital in which stenosis of the cervix resulted from various causes and in which a permanent cure was difficult to obtain. Dr. Frank believes that the best method of treating such cases of stenosis and scar formation of the cervix is to open up the cervical canal posteriorly as in a Dudley trachelorrhaphy, stripping up the peritoneum to a considerable distance and entering the uterine cavity, after which the vaginal mucosa is sewed over the remains of the cervical lip or scar.

Dr. Frank also referred to a case seen five years ago of a young woman who had had an exploratory laparotomy performed in childhood. When first seen by Dr. Frank the abdomen was enormously distended. The peritoneal cavity could not be entered at the time of operation because of the numerous adhesions between the peritoneum and intestines. Following a difficult dissection, the mass was found to be a large ovarian cyst similar to that found in Dr. Oastler's case. After drawing off the fluid, about two-thirds of the sac was removed

and the remainder had to be left behind. The uterus and ovaries were apparently normal.

DR. HERMANN BOLDT asked whether the physical examination of the patient with an ectopic pregnancy disclosed any marked tenderness of the vaginal portion of the cervix when moving the same with the examining finger. Dr. Oastler replied that there was no pelvic pain at any time, not even during her periods.

DR. MABBOTT, in commenting on the case of ectopic, referred to the expression used by the speaker that before the operation he had found both ovaries and tubes normal. Dr. Mabbott referred to the fallacy of calling tubes normal if they were not felt at the time of examination and he thought that we were prone to extend the same idea to the ovaries. He believed that we ought to be more careful of our use of the descriptive terms "normal" and "negative." Normal should imply that we are satisfied that there is nothing the matter if the examination is satisfactory. Negative may be assumed to mean simply that we failed to find anything wrong, in other words, it means that nothing definite is demonstrated to our minds when we make the examination. He thought it quite evident, as Dr. Oastler admitted in his subsequent description, that an error was made in the examination and that the tube could not have been normal during the few days before operation.

DR. RALPH WALDO had listened to Dr. Oastler's description of his cases with great interest, especially the third one, as it illustrates again the fact that classic symptoms of ectopics are the exception rather than the rule. One of the most important symptoms differentiating between incomplete abortion and extrauterine pregnancy is the persistency of hemorrhage after curettage of the uterus.

DR. G. H. MALLETT reported a case which came under his care some years ago which was sent to him by a general practitioner with a diagnosis of unruptured ectopic gestation. An effort had been made to induce abortion and she had been sent to another doctor and he curetted her, and there was still another curettage inside of two weeks. The diagnostic symptoms were persistent bleeding after curettage and a soft elastic mass felt in the tube. The uterus was exceptionally tender upon examination. This was the only case he had ever seen of ectopic gestation which was diagnosed before rupture.

DR. OASTLER in closing said that in his report of the case it was his intention to show that he had found by examination that the ovaries and tubes were apparently normal to the touch. This probably was an error. On making the examination again five days later he found a small mass which he had not felt before and which might have been a good-sized ovary or an ectopic gestation. This mass together with sudden onset of constipation which had persisted, continual bleeding following curettage, and the absence of anything abnormal in the curettings led him to make the diagnosis of unruptured ectopic gestation. As the question when to tap an ovarian cyst has been the cause of much difference of opinion he never taps a papillomatous cyst when he can keep the cyst close to the abdominal wall and so prevent leakage into the abdominal cavity. He

taps only in cases where the cyst is apparently unilocular, is of large size and where the contents are apparently sufficiently fluid to run out easily. Small cysts, which can be determined through an ordinary abdominal incision, in his opinion should not be tapped but simply removed, as the danger of tapping a cyst lies principally in the escape of a portion of the contents into the abdominal cavity, which should be avoided.

DR. HERMAN J. BOLDT presented several specimens.

A CASE OF GYNATRESIA.

Mrs. A. S., aged twenty-three years, married nine months, had never menstruated. She complained of pain in the sacral region and for a period of three to four days of every month of pain in the left lower abdomen. She was operated upon on two occasions, once per abdomen, and once from below, by a prominent gynecologist in this city. From these operations no relief was obtained, but a large rectal fistula resulted. Examination showed a rudimentary vagina, if a dimple less than 1 cm. in depth may be so called. Immediately above the anal sphincter was a fistula in the rectum 1.5 cm. in diameter, which communicated with the rudimentary vagina. Her physician told me that through that opening marital relations took place. Rectal examination showed the presence of a small cervix which was in contiguity with the uterus, but the mass which impressed one as being the uterus was somewhat harder in consistency, broader and thicker than a normal virginal uterus. On the left posterior surface of the uterus and intimately attached to it was felt a smaller mass, very sensitive to the touch, having the shape of an ovary; its surface was studded with small, hempseed-sized cysts. On the right side a similar condition was felt, but the mass was smaller in size and not so sensitive to the touch. These two masses were diagnosed to be the ovaries in a condition of small cystic degeneration. The Fallopian tubes could not be palpated. The plan of operation was outlined and included opening the abdomen and freeing the uterus and adnexa, as is done for the purpose of doing a panhysterosalpingo-oöphorectomy. Then he proceeded to eliminate about ten inches of the ilium to be used as an artificial vagina, restoring the intestinal canal by lateral anastomosis. It was intended to leave the making of the canal, into which the bowel for the vagina was to be placed, as the last step, because of the mishap of the previous operator. Dr. Boldt believed that there would be less risk of injury to the rectum, in this particular instance, to make the canal with the abdomen open. As the result of the previous abdominal operation there were many pelvic adhesions, but none that could not be readily overcome. About six inches of ilium next to the cecum was rather firmly adherent to the posterior surface of the uterus and to the pelvic floor. It had so much macroscopical evidence of inflammation that it was thought best to exclude it. Dr. John F. Erdman, who chanced to be present as a spectator, was good enough to accept the task of doing the intestinal anastomosis, while Dr. Boldt did the

rest of the work from below, that is, the closing of the rectal fistula and the making of a canal for the imbedding of the intestine which was to form the vagina. In this way he hoped to save time for the patient and also make the canal more safely. To acquire better access for the anastomosis, the uterus was amputated to within about 1 cm. of the terminal part of the cervix. In the small cervical cavity there was a small quantity of comparatively fresh blood. About ten inches of ilium, beyond the inflamed and strictured area, was eliminated from the intestinal tract, and the lateral anastomosis was made between the cecum and ilium, thus obviating all risk of future trouble from the formerly adherent part of the bowel. With Dr. Erdman's assistance, Dr. Boldt was enabled to work his way into the pelvic cavity in the septum behind the bladder without any injury to bladder or rectum. Then the eliminated part of the bowel was grasped at the median point and drawn down to the vulvar orifice. The apices of the bowel were next sutured with interrupted catgut stitches to the cervical stump and the abdomen closed. The distal coil of bowel was then sutured to the vulva with a few interrupted fine silk sutures. Next the bowel was opened and the interior cleaned with gauze strips soaked in boric acid solution. The everted bowel was further attached to the vulva with a few additional stitches. Dr. Boldt stated that up to the present time the prospect was promising and he trusted that he would have the opportunity of presenting the patient at a subsequent meeting of the society. Much credit is due to Dr. Baldwin for first utilizing the intestine for the making of an artificial vagina. That is the only method that has given satisfactory results. Dr. Boldt also showed a uterus removed by panhysterocolpectomy, and called attention again to that operation as being the only one that would always give a satisfactory result in instances of total prolapsus of the uterus and vagina. But it must be remembered that it is indicated only in that class of patients in whom the vaginal canal is of no further necessity.

DISCUSSION.

DR. H. D. FURNISS stated that within three weeks he had seen two similar cases, and as far as could be determined there was an absence of uterus, tubes, and ovaries in both cases. Otherwise the women appeared normally developed. They came, as they were about to be married, to learn why they were not menstruating and to find out, if they became married, whether or not menstruation would be established.

DR. G. G. WARD also referred to a patient just seen, in whom there was a complete absence of uterus. The vagina was a depression about 3 or 4 cm. in depth. The woman was about twenty-five years of age, married and applied to the clinic on account of her lack of menstruation. She also apparently had a growth or mass in the right side of the pelvis for which Dr. Ward did an exploratory laparotomy and found the same to be an ectopic kidney. Examination showed a complete absence of the uterus although the ovaries were both pres-

ent and normal. The outer ends of the Fallopian tubes terminated in cords which ran to the top of the vagina. The absence of the kidney on the left side added still more interest to the case. The kidney was not replaced in its normal position as advocated by Dr. Dougal Bissell as no advantage appeared to attach to such a procedure. Dr. Bissell, who was present, stated that he agreed that there would have been no advantage in restoring the kidney in a case such as this where the generative organs are absent or seriously deformed. Moreover, he did not consider it necessary to replace a pelvic kidney when associated with normal generative organs unless the symptoms of which the patient complained can be ascribed to its presence. In any of the cases in which he had done a restorative operation there were no abnormalities present except in the kidney itself, its blood-vessels or ureters.

DR. OASTLER stated that some years ago he had an opportunity to see a case that had been operated on in Russia for absence of the vagina, in which the organ had been restored by transplanting flaps of skin taken from the mons and the labia majora. An unfortunate complication which resulted consisted in the fact that the hair continued to grow on the transplanted flap and a considerable protrusion of the same from the new vagina was present.

DR. BOLDT in closing said that he had met with two or three instances of transplanting operation but had not been favored with a permanent successful result. He considered the method described the most rational and logical for the purpose of making a new vagina.

DR. HERMANN GRAD presented a report on a

FIBROID IN A DOUBLE UTERUS.

Mrs. M. F., age forty-six, was seen for the first time in July, 1913. She had been suffering with menorrhagia for the past year and also had blood-tinged vaginal discharge. The family history was negative. Her first menstruation was at twelve years, she flowed for six days, amount moderate, regularly every twenty-eight days. Last period July 13, 1913. She was married twenty-six years and had three children, one twenty-five, one twenty-three and one nineteen years old. Her last pregnancy was seven years previously and terminated spontaneously at the eighth month. Her first confinement was instrumental, the last were normal deliveries. She had never been ill, except for malaria two years ago and had never had venereal diseases.

Two years ago about April she began to suffer with a profuse menstrual flow. She would at times go on spotting for the whole month. Previous to this time her menstruation had been quite regular. She suffered from no other symptom, no backache, no headache, no digestive disturbance, no constipation.

Bimanual examination revealed a good-sized fibroid tumor, the uterus symmetrical, no adnexal diseases discoverable. Patient very anemic, but no cardiac or vascular disturbance to be noticed. In view of the increased menorrhagia and size of the tumor, she was advised to submit to hysterectomy.

She was submitted to the Woman's Hospital July 27, 1913, for the removal of a large fibroid tumor. On opening the abdomen in the median line below the umbilicus, a fibroid tumor came into view but it was noticed that the direction of the two round ligaments was somewhat unusual. The right one seemed to be at a lower point of insertion than the left one. A panhystero double salpingo-oophorectomy was performed in the usual way. During the closure of the



FIG. 2.

abdomen an umbilical hernia was also repaired. The patient made an uneventful recovery.

The specimen was of considerable interest and the following is the pathological report:

Specimen.—Myoma with adnexa.

Diagnosis.—Uterus bipartitus myoma.

Specimen shows a large myoma to which adnexa are attached. To one side of this myoma the course of the uterine cavity can be outlined. Two cavities are discoverable which are entirely separate

from each other, both of these cavities are lined with mucosa. One cavity leads into one tube and the other cavity leads into another tube. The spur between these two cavities is formed by uterine musculature and the deep groove on the serous surface about 3 cm. in depth shows the place where partition of both cavities can be formed. The myoma bulging into the uterine cavity measures 12 cm. in diameter. Both adnexa appear to be normal.

Microscopical.—Section of myoma with mucosa shows a very thin remnant of mucosa containing only traces of glands. Myoma itself is dense and acellular. Shows large lymph spaces. Section of the mucosa on the side away from the myoma shows a hyperplastic mucosa, glands of the interval type, somewhat dilated, myometrium normal.

DR. ROBERT T. FRANK reported the following case:

PREGNANCY IN A CASE OF POLYCYTHEMIA.

This case presented several problems in which neither a search of the literature or personal inquiries were of much service.

The patient, a primigravida thirty-six years of age, married one year, was referred by Dr. Louis Hauswirth, to determine whether pregnancy should be allowed to continue. Dr. Hauswirth had discovered the presence of polycythemia (splenomegaly, high red blood count, 7,000,000, hemoglobin 120 per cent. (Sahli 102 per cent.) dyspnea and cyanosis) shortly after her marriage, and had succeeded in ameliorating the symptoms by x-ray therapy.

The patient appeared to be in fair health, with spleen extending to 2 inches below the umbilicus and nearly to the median line. She was found to be three and one-half months pregnant. Her pelvis was normal.

In arriving at a conclusion the following points had to be considered: 1. Would the disease be aggravated by pregnancy? (During the first three months no exacerbation was noted.) 2. Would the enormous spleen, acting as a large intraabdominal foreign body, cause abortion or premature termination of pregnancy? (A knowledge of two cases of Dr. N. E. Brill, suffering from splenomegaly of the Gaucher type, who successfully bore full-term children, served to minimize the likelihood of this danger.) 3. Would the spleen serve as an obstruction during labor, or be liable to be bruised and ruptured? (This danger appeared to be slight, because reports of fixed spleens obstructing labor could not be found, and because splenic hemorrhage intrapartum is exceptionally rare.) 4. Finally, was the baby likely to be normal? (Its chances were considered excellent, as, of the fifty-three or more cases of polycythemia reported in the literature, only one began at ten years of age, the others all being young or older adults.) Therefore it was determined to allow the pregnancy to continue.

The patient reached term without any unusual symptoms. Her blood picture remained unchanged. The spleen was pushed upward and to the left by the enlarging uterus. This increased the dyspnea considerably.

At the calculated period labor pains set in and continued for six hours. Not until eight days later did real labor develop. The uterus, throughout pregnancy, had been found unusually small, the fundus broad and flattened (splenic pressure). The presentation was cephalic. The first stage lasted four hours. After two hours of strong second-stage pains the head had reached the perineum. No further advance was made in the succeeding hour. As it appeared undesirable to allow the somewhat exhausted patient to make strong bearing-down efforts (spleen!), forceps were applied to the head in O. P. The cord at once prolapsed past the head. The forceps were removed, the head manually rotated into O. A. and the forceps reapplied. To facilitate immediate delivery, an episiotomy was performed, and a living normal female child, weighing six pounds, extracted. Hemorrhage was unusually slight. After twenty-five minutes an unusually small and much calcified placenta was spontaneously expelled.

The puerperium was normal. The infant has thrived. Its blood count is normal. The mother's blood shows slight changes, both the red cells and hemoglobin being normal (four days postpartum). The spleen is again well below the umbilicus.

DISCUSSION.

DR. A. B. DAVIS referred to a case of splenomegaly which came to his service at the Lying-In Hospital about five years ago and which he had since reported. There was present a large tumor that could be moved around in the abdomen but seemed to spring from the right side and extended from the ribs downward almost to the pelvis. The blood count at the time was practically normal. A laparotomy was done and the growth readily removed without interrupting the pregnancy which was present. It was found to be a very large spleen. Daily blood counts were taken without any perceptible changes in the white cells noted. The subsequent labor and puerperium were perfectly normal.

DR. AUSTIN FLINT, JR., referring to the rarity of this condition of the blood in pregnancy stated that in his own experience he had never seen a case exactly like the one Dr. Frank reported and asked whether the pregnancy itself would have any influence on the blood count as regards an increase in the number of red cells. Dr. Flint called attention to the belief ordinarily held that pregnancy increases the total quantity of blood, which in the early months is confined chiefly to the watery elements producing a relative hydremia, although in the later months there is also an increase in the number of the red blood cells. Dr. Flint inquired whether there was any variation from the normal increase of red cells as shown by blood counts made in the later months of pregnancy in Dr. Frank's case.

DR. FRANK in closing said that in his case there had to be considered not only the mechanical obstruction due to the splenomegaly, such as in the case described by Dr. Davis, but the serious disturbance in the blood which might very readily be unfavorably affected

by pregnancy. Apparently, however, it was not in this instance. After labor, in which the hemorrhage was very slight, the blood count showed a considerable diminution in the number of red cells, that is, they were about 4,500,000 instead of 7,000,000 and the hemoglobin which previously was 102 per cent. had come down to 94 per cent. which of course was still very high for a woman. The white cell count was never high, in the neighborhood of 15,000 throughout the pregnancy. Polyneucleosis, which is more or less characteristic of polycythemia, remained the same throughout. The viscosity of the blood which is ordinarily increased in polycythemia, according to other writers, was not determined.

DR. O. PAUL HUMPSTONE reported

A CASE OF DYSTOCIA AND DEATH OF FETUS DUE TO CONGENITAL
CYSTIC KIDNEYS.

He referred to the fact that surgeons frequently met with congenital cystic kidneys which have not interfered with the mature

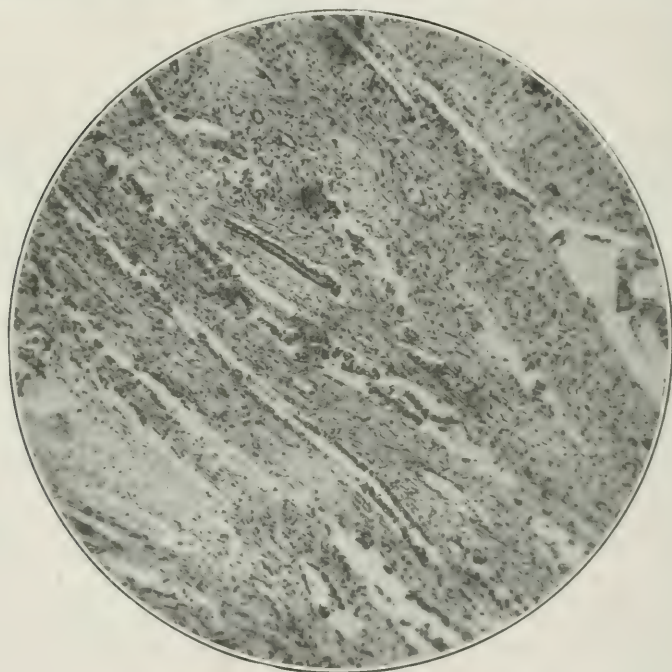


FIG. 1.—Polycystic kidney. Section of the cortex. Shows thickened capsule, diminished Malpighian bodies, dilated secreting tubules. $\times 100$.

development of the individual; and doubtless moderate congenital cystic kidneys were frequently overlooked by obstetricians. Occasionally, however, the condition is so extreme as to cause dystocia and death of the fetus from interference with respiration. The con-

dition is casually mentioned in text-books. It seemed of sufficient clinical and pathological interest to present for the consideration of the Society the following case report with specimen.

Mrs. X (No. 22596, Jewish Hospital, Brooklyn), a private patient, had a normal pregnancy. She went into labor at term. The fetal heart sounds were normal, and there was no polyhydramnios. She had a prolonged first stage with a breech presentation. Labor was completed by manual dilation of a thoroughly thinned and softened cervix, and by breech extraction. Considerable difficulty was experienced in drawing the torso of the child through an ample pelvis, but was accomplished without evisceration. After birth the child made

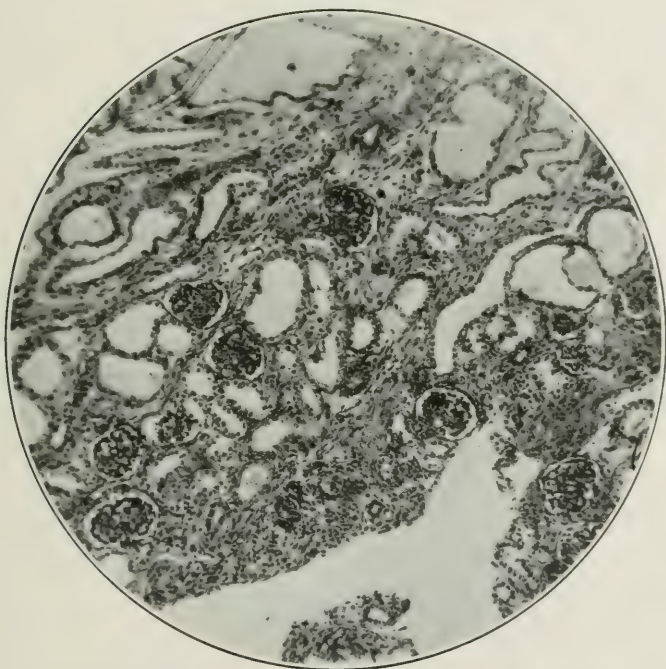


FIG. 2.—Polycystic kidney. Section of papilla. Shows very greatly increased connective tissue compressing the unopened collecting tubules. $\times 100$.

ineffectual effort at respiration and died. Examination showed the abdomen very greatly distended by a large tumor in each lumbar region, which interfered completely with the action of the diaphragm. The clinical diagnosis was tumor of the kidneys.

The autopsy report of Dr. Blatteis showed the right kidney weighed 140 grams and measured $112 \times 75 \times 38$ mm. The left kidney weighed 150 grams and measured $100 \times 62 \times 38$ mm. The pathology of both organs was identical. The capsules stripped easily. The stellate veins did not show. There were numerous subcapsular

hemorrhages. Both kidneys were very pale in color, of a pulpy consistency. On section the first impression was that the tissues were waterlogged (edematous). There were visible over the entire cut surface minute spaces about the size of millet seeds. The cortex was thin and the markings very distinct, but not normal, the color being very pale. In the medulla the same appearance prevailed. The differentiation between the cortex and the medullary rays could not be made. The blood-vessels could not be made out. The pelvis was normal, empty and not dilated. On cutting the specimen and squeezing the parenchyma of the kidney, fluid was expressed, yellowish in color and of urinous odor.

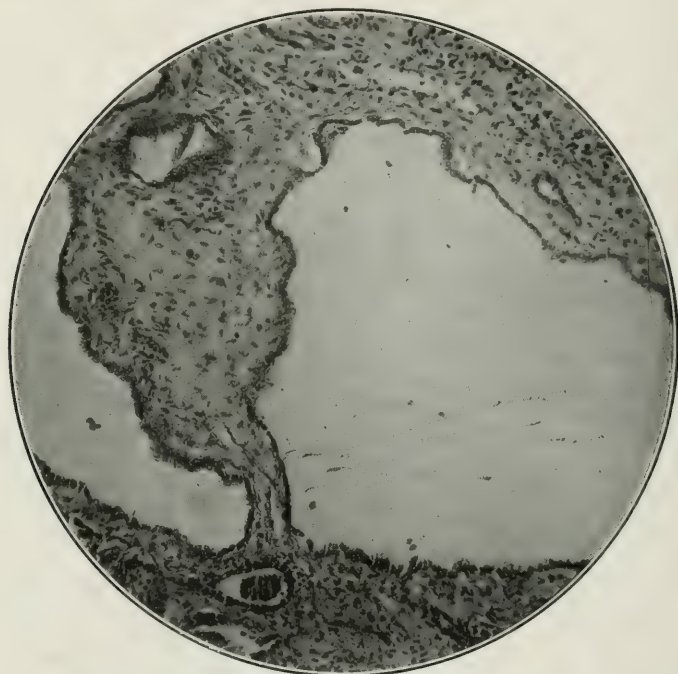


FIG. 3.—Polycystic kidney. Section of medulla. Shows greatly dilated secreting tubule. Note columnar epithelium and increased amount of connective tissue.

Histologically, the capsule was much thickened and less dense than normal. Immediately beneath the capsule there were here and there hemorrhagic extravasations. The Malpighian bodies were fewer in number than normal and were imbedded in broad bands of fibrous tissue. Very few cross-sections of convoluted tubules were present. There were present in all portions of the kidney small and large spaces which from the character of the epithelial lining were portions of the uriniferous tubules. These spaces were fewer and smaller in the cortex, more numerous and wider in the medulla

and entirely absent in the papillary portion. The type of epithelium lining all these spaces was cuboidal and these spaces were empty except for the presence of exfoliated epithelium.

Between the dilated spaces were broad bands of fibrous tissue containing blood-vessels and collections of epithelial cells suggesting incomplete uriniferous tubules.

The amount of connective tissue increased markedly as one approached the papillæ. The lumina of the collecting tubules were narrower than normal and the latter were markedly diminished in number.

The cause of this condition has been the subject of much debate among pathologists.

Virchow regarded it as due to fetal inflammation affecting the medulla and leading to constriction and atrophy of the terminal portions of the collecting tubules. Others considered the condition adenomatous. The consensus of opinion at the present moment is that we deal with a condition of arrested development. (Adami's *Principles of Pathology*).

Herring, Schirrer, and Carl Huber of the University of Michigan, have conducted the most careful and thorough study of the development of the uriniferous tubules. It is the result of their investigations which has led to the now general opinion that the secreting tubules arise from the nephrogenic blastoma, while the collecting tubules are formed by a continuous process of budding from the primary pelvis of the kidney. It is the failure of these two portions to unite, with the consequent retention of the secretion and dilation of the secreting tubules, which results in this pathological condition. (G. Carl Huber, *American Journal of Anatomy*, Supplement to vol. iv.)

DR. J. O. POLAK reported

A CASE OF ECTOPIC GESTATION.

The report of this case illustrated a type of ectopic gestation, *i.e.*, pregnancy in congenitally deformed tubes, and was the tenth repeated tubal pregnancy occurring in a woman who had never had an extrauterine gestation in which he had operated. The history of this case was as follows: Mrs. B. C., aged twenty-nine, married six years, was always in perfect health before her marriage with the exception of severe dysmenorrhea. Menstruation more or less irregular, from three to fourteen days overtime, quantity normal. She was operated on by Dr. Polak for an ectopic on the left side in the winter of 1909-1910, the left tube being removed. The following observations were made at that time: The pelvis was of the funnel type, uterus small, cervix and body being of nearly equal length, the right tube elongated and markedly tortuous. Her recovery from this operation was satisfactory and in February, 1912, all pelvic symptoms were absent with the exception of cramps at each period. At this time she anticipated her period by a few days and continued to have a reddish-brown discharge mixed with mucus. There was

complaint of occasional sharp pelvic pains. An examination revealed a slightly enlarged uterus with both fornices free. The woman was curetted but no decidual tissue was found in the specimen. A Dudley operation was done on the cervix and for the last year and a half her periods recurred every twenty-eight days and were free from pain. On September 15, 1913, the patient again anticipated her period by six days and continued to flow. On October 3 she had an attack of sharp abdominal pain referred to the right lower quadrant, which reoccurred on the 9th, just after she was examined by her physician. When seen on October 13 the patient had a reddish-brown discharge, the cervix was sensitive to pressure and an insensitive sausage-shaped movable mass was noted to the right of the uterus in the culdesac. The pulse was 80, hemoglobin 60, red cells 4,000,000, leukocytes 7000, polys 72 per cent. A diagnosis of ectopic gestation in the right tube was made and was confirmed by a culdesac incision and the abdomen was then opened under gas, oxygen and ether anesthesia and the tube removed. The site of the previous operation was free from adhesions although the uterus was drawn to the left by a shortened ligament. In all of the repeated ectopics in undeveloped pelvic organs which came under Dr. Polak's observation there had been a period of anomalous uterine bleeding in the interim between the uterine gestation.

DR. G. H. MALLETT reported a case of

GAUZE PAD LEFT IN ABDOMEN DURING AN OPERATION.

The patient was twenty-nine years old and stated that during February, 1913, she complained of a severe pain in the right iliac region for the relief of which she entered a hospital in this city. The appendix was removed about March 1, but failed to give relief and three weeks later another laparotomy was done with the removal of the right tube and ovary. The recovery was uneventful until she left her bed three weeks later when she began to suffer from pain which was located below the umbilicus. This pain was of a tearing and gnawing character and steadily increased in severity so as to incapacitate her to such an extent that she was again compelled to enter the hospital. After remaining there for three weeks she was discharged unimproved. When admitted to Dr. Mallett's service at the General Memorial Hospital, a mass was felt high up in the pelvis behind and to the right of the uterus and a diagnosis of intestinal adhesions was made. Upon opening the abdomen the omentum was found covering a loop of ileum, and when separated a gauze pad was found reposing within the loops of the intestine. During the attempts to remove the same, it was seen that the pad had worked its way into the lumen of the gut in two places. These openings were closed with Lembert sutures. Dr. Mallett exhibited the gauze pad which was found to be tightly compressed. Before closing the abdomen the omentum was brought down over the sutured intestines and vaginal drainage introduced.

DISCUSSION.

DR. BOLDT inquired whether there was any considerable infiltration of the walls of the bowel at the point of perforation. He acknowledged having unfortunately had a few of these cases and in the instances where the bowel had been perforated there was some infiltration present.

DR. MALLET stated that there was considerable infiltration in the walls of the intestine but less than one would have expected and not enough to prevent the closure of the openings.

DR. POLAK asked Dr. Mallett if there were any sinuses remaining after any of these abdominal wounds?

DR. MALLET answered no, there were no sinuses following the previous operations. The pad was simply lying in a loop of the ileum and when a foreign body of this kind ulcerates or works its way into the intestine, it usually happens in the rectum. In this case the intestine curved almost around the gauze.

DR. H. D. FURNESS reported

A CASE OF HYDRONEPHROSIS IN A GIRL OF FOURTEEN.

The patient began to have attacks of cramp-like pain in the left lumbar region in April, 1912. This was associated with nausea and vomiting and lasted from one to two hours, preceded by headaches the previous day. The amount of urine was usually lessened during an attack. At first the condition was noted every month or two and then the intervals became gradually less and in January, 1913, she was having two attacks a week, which lasted from six to twenty-four hours. In March and April, 1913, the attacks came on once a week and generally on the same day which was pointed out as a significant point in the history. There were no evidences of a stone having been passed or blood being present in the urine and the radiographs were negative. An examination of the catheterized specimen showed a large amount of pus which on staining disclosed cocci, single and in clumps. No acid-fast bacilli were found. Cystoscopic examination disclosed a cystitis colli and the bladder was tolerant for only 180 c.c. of boric acid solution. Both ureters were catheterized, the urine from the right side was free from pus and no urine was obtained from the left until the catheter was pushed into the pelvis when an ounce of urine was collected. Phenolsulphonaphthalein was injected and did not appear in the urine of the left kidney until nineteen minutes later. Within half an hour only a trace was eliminated. Normal elimination from the right side occurred and an argyrol radiograph of the left kidney showed indistinct shadows on a level from the last dorsal vertebra. These consisted of three portions, each the size of a silver dollar and more or less separate. From the diminished elimination of phenolsulphonaphthalein, the collection of a large amount of urine from the pelvis, and the indistinct argyrol picture, the diagnosis of an infected hydronephrosis due to urethral stricture was made. On May 14, 1913, a nephrectomy was

done on the left side. The specimen which was exhibited consisted of a kidney $10.5 \times 7.5 \times 3.5$ cm. The pelvis was greatly dilated, measuring 4.5 cm. in diameter. A section of the kidney showed a series of communicating sacs filled with clear fluid surrounded by firm connective tissue and a narrow rim of kidney tissue from 1 to 3 cm. in thickness. Microscopically small areas of fairly normal kidney tissue were present but elsewhere there was a pronounced fibrosis with areas of partial or complete disappearance of tubules and sclerosed glomeruli. Nodules of round-cell infiltration were frequent. Many of the collecting tubules appeared distended and casts were frequent in the convoluted tubules, especially in the sclerosed areas. The patient made a complete recovery and remained free from symptoms.

DR. LEROY BROWN reported the following case of

MYOSARCOMA OF UTERUS.

Mrs. T. G., age fifty-eight, married and has had four children, the oldest thirty-three and the youngest twenty-two years old. She was regular in her monthly flow which was of a thirty-day type, until ten years previously. At this time the flow began to decrease in amount, became irregular, but continued to appear for the next seven years. For two years past there had been no show of blood. The patient had been under the care of Dr. Holland who found it necessary at intervals to give her office treatment on account of the pelvic pains and backache. Twenty-seven years before entering the Woman's Hospital she was in the German Hospital for what she describes as "ovarian trouble." The left ovary was removed, evidently through the vagina, at this time. The patient presented herself to Dr. Brown with marked pelvic pains. On examination a fibroid tumor almost filling the pelvis was recognized. This tumor appeared to be fixed and the adnexa were surrounded by adhesions.

Operation was done Sept. 30, and proved to be peculiarly difficult. The adnexa were bound down behind the adherent uterine tumor which completely filled the true pelvis. A short fleshy abdomen and deep pelvis added to the difficulty of reaching the infundibulo-pelvic ligaments, as also that of reaching the uterine arteries later on. During the retraction necessary to reach the left side, a venous sinus on the posterior face of the broad ligament was torn through, which resulted, on account of the inability to reach it, in an annoying bleeding. In patients of about this age where Dr. Brown found it necessary to remove a uterine fibroid he thought it wise to do a complete hysterectomy, on account of the possibility of degenerative changes. In this instance, an amputation at the internal os was done on account of the necessity of hastening the operation. The patient has made an uneventful recovery.

The pathological examination of the specimen is as follows:

Macroscopical Examination.—Uterus without cervix. Uterine body is changed into an oval tumor 12×7 cm. This is due to an intramural, very soft myoma which is well encapsulated. Uterine

mucosa is apparently atrophic, yellowish. Both adnexa show similar changes. The ovary is enlarged and contains cavities 1 to 2 cm. The ovary measures $4 \times 2 \frac{1}{2} \times 1$. There seems to have been a small abscess cavity present. Tubes thickened, walls apparently infiltrated. Section from ovary, tube, mucosa and uterine tumor.

Microscopical Examination.—Tube shows hyperplasia of musculature with diffuse round-cell infiltrations. False gland formation and growing together of plicæ. Uterine mucosa very atrophic, glands slightly cystic, piercing obliquely through stroma. Large lymph spaces. The uterine tumor shows a very dense, irregular mixture of short and large spindle cells. There are streaks of edematous areas and in certain portions the tumor assumes such a density that the individual elements can hardly be made out. Numerous papillary blood-vessels showing no media are scattered in the tumor mass, a distinct relationship between the mass and the blood-vessels cannot be ascertained. Diagnosis: salpingitis chronica, sarcoma-uteri, myocellular.

In looking up the frequency of the occurrence of sarcomatous changes in fibroid tumors of the uterus, it appears that we have no definite idea as to the same. Mayo in 1000 cases gives the frequency as $1 \frac{1}{3}$ per cent., Kelly-Noble in 2274 cases find 2 per cent. On the other hand they quote Winter as stating that in 500 cases in which only the grossly suspicious areas were examined, sarcoma was present in 3.2 per cent. and in 253 cases in which systematic sections were taken throughout the uterus 4.3 per cent. were found to be sarcomatous. The statements of Winter rather agree with those of Graves, when giving the results of his work in systematic sectioning of fibroids removed from patients in the Boston Free Hospital for Women, which gave sarcomatous changes in something like 4 to 5 per cent. With this difference of opinion Dr. Broun was inclined to think that Winter and Graves were more nearly correct, as systematic sectioning had been done in their specimens and in other instances only examinations of grossly suspicious parts were made.

DISCUSSION.

DR. WALDO asked whether the specimen presented was a fibroid that underwent sarcomatous degeneration or was it sarcoma from the beginning.

DR. BROUN said that he had abridged the pathological report but the condition was one of sarcomatous changes in the myomatous elements of the uterine tumor.

TRANSACTIONS OF THE SOCIETY OF THE ALUMNI OF THE SLOANE HOSPITAL FOR WOMEN.

Meeting of October 24, 1913.

The President, DR. ARTHUR W. BINGHAM, in the Chair.

DR. D. S. D. JESSUP, pathologist to the hospital, presented several specimens of cases from the hospital service.

CASE I. HEMATOMA OF LIVER.

This was a case of sudden death four days after birth, in an apparently normal baby weighing 10 pounds, 1 ounce. Autopsy showed



FIG. 1.—Hematoma of liver showing point of rupture.

a large well-nourished female infant. On opening the peritoneal cavity this was found to be filled with fluid blood which was traced to a large ruptured hematoma of the upper and outer surface of the liver (Fig. 1), involving the whole right lobe. The liver weighed 245 grams. Examination of the outer surface of the ribs over the liver showed hemorrhages in the subcutaneous tissues and there

were also small hemorrhages over the outer surface of the right lung in this region. The other organs were normal. The birth had been a normal one with a vertex presentation. The shoulders were large and stuck, and considerable pressure on the fundus was necessary to accomplish their delivery. It would appear that this pressure had forced the thorax against the symphysis and so caused a contusion of the liver with hemorrhage beneath the capsule and rupture of the hematoma four days later, with shock, collapse, and death three hours afterward.

CASE II. NORMAL INVOLUTING UTERUS.

This was removed from a woman dying of bronchopneumonia five days postpartum. It showed very well the condition of the uterine wall with its sinuses and vessels and thrombus formation.

CASE III. SECTION OF LIVER SHOWING SPIROCHÆTÆ PALLIDA.

This was obtained from a seven and one-half month's fetus weighing 1700 grams in which two-thirds of the abdominal cavity was filled with an enlarged liver weighing 185 grams. The spleen and pancreas were also enlarged. Microscopical examination of these organs and also of the kidneys showed a marked interstitial inflammation and Leviditi stain showed large numbers of spirochætæ in the liver.

DR. CHARLES C. LIEB read the paper of the evening entitled

PHARMACOLOGIC ACTION OF ECBOLIC DRUGS.¹

TRANSACTIONS OF THE NEW YORK ACADEMY OF MEDICINE.

SECTION ON OBSTETRICS AND GYNECOLOGY.

Stated Meeting, Held October 28, 1913.

DR. GEO. GRAY WARD, JR., *in the Chair.*

The program was furnished by the Staff of the Lying-in Hospital, New York City.

DR. EDWARD S. GUSHEE presented

A REVIEW OF THE CRANIOTOMIES RECENTLY DONE AT THE LYING-IN HOSPITAL.

He said that from 1903 to 1913 there were delivered in the two services, the out-door and the in-door departments of the Lying-In

¹ For original article see page 1.

Hospital, 52,133 patients. In the out-door department there were 30,549 deliveries; of these there were sixty-four craniotomies, which is about two-fifths of 1 per cent. of the deliveries. In the hospital proper, during this period, 21,584 cases were delivered; among this number there were 258 craniotomies or 1 per cent. of the cases delivered.

The marked difference in the percentage of craniotomies in the two services is due to the fact that in the out-door service nearly all the cases were entirely under the observation of the hospital staff, whereas in the hospital over one-half were emergencies (167), and 125 of these had had unsuccessful attempts at delivery by outside physicians or midwives. This leaves ninety-one cases of craniotomy which occurred directly under the hospital supervision or in two-fifths of 1 per cent. of the 21,584 hospital deliveries.

Of these ninety-one craniotomies, twenty-one were in eclampsias and seven were in cases of placenta previa with premature dead babies. In twenty-nine craniotomy was done for one of the following causes: hydrocephalus, chondrodystrophy, impacted face, brow, tuberculosis with premature dead fetus, diabetes mellitus, endocarditis, chronic nephritis, eclampsia and placenta previa full term with dead babies. The remaining twenty-three cases were borderline cases.

In the hospital service, although there was an increase in the last five years of about 4000 deliveries, there was a decrease of 2 per cent. of the craniotomies over the previous five years, and in the tenements, although the increase of deliveries was only slight, there was a decrease of 20 per cent. in the craniotomies over the previous five years.

The marked difference shown in the maternal mortality between the two services is striking.

In the hospital there were thirty-seven deaths, which is 10 per cent. of the craniotomies or 0.1 per cent. of the deliveries.

In the out-door service there was only one death. A midwife had been in attendance on this case forty-eight hours before the hospital doctor was called in.

Of the thirty-seven deaths of mothers in the house, six were due to complicating causes with one exception.

Of the thirty-one emergency cases eighteen died of shock or hemorrhage, ten died from sepsis and three of eclampsia.

Conclusions.—The high percentage of craniotomies of the indoor service is accounted for by the emergency cases sent in at all stages and of the cases which had been tampered with on the outside.

The low percentage of the out-door cases is due to the fact that the cases are under observation early enough so that they may be transferred to the hospital in time to permit of a Cesarean section.

The operation of itself is not necessarily responsible for the death of the mother but rather to the state of shock to which she has been subjected or to some complicating condition.

DR. JAMES W. MARKOE presented

A SET OF OBSTETRICAL INSTRUMENTS AVAILABLE FOR THE GENERAL PRACTITIONER.

He said that every general practitioner should have a similar set of instruments which could be used in any emergency. What he presented could be used in almost every obstetric operation ex-

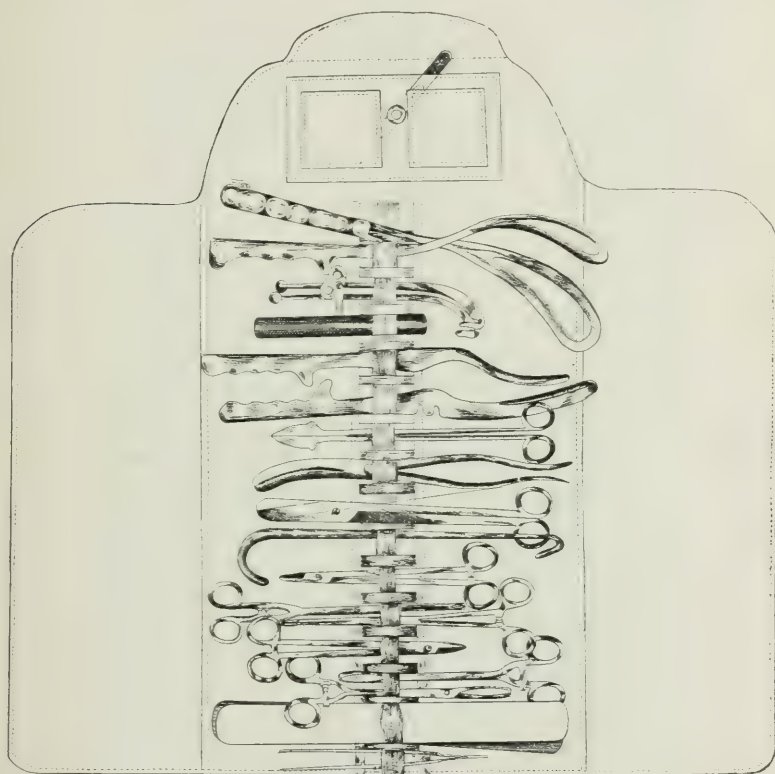


FIG. 1

cept that of Cesarean section, pubiotomy and some other procedures which the general practitioner was not supposed to perform.

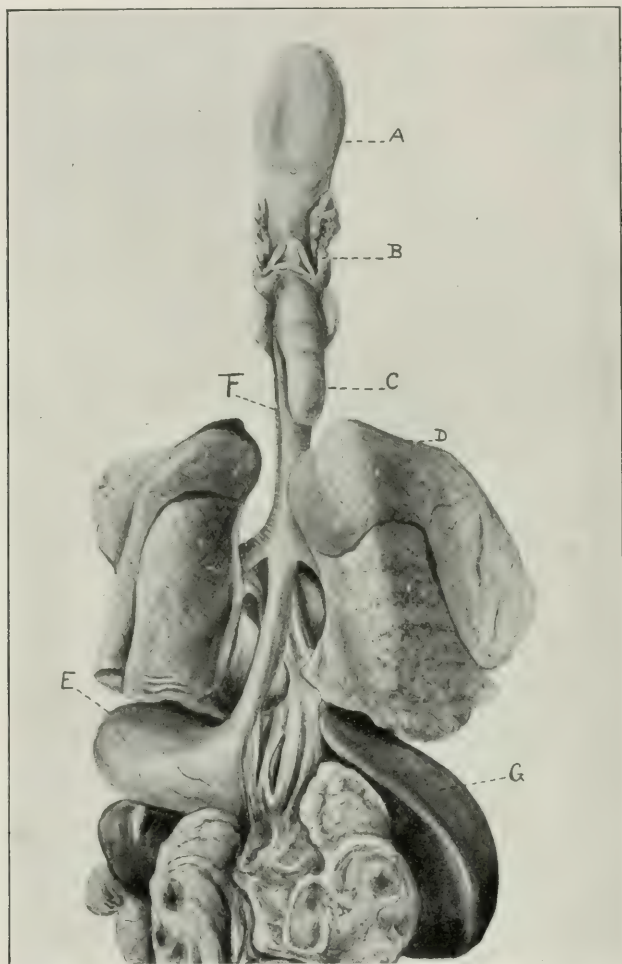
DR. J. R. LOSEE reported two cases of

ESOPHAGOTRACHEAL FISTULA.

He stated that among the most common anomalies of the esophagus is esophagotracheal fistula, for of sixty-two cases collected by McKenzie forty-three had communication with the air passages.

The case which was reported was delivered normally at term and needed little or no effort at resuscitation. However, it was soon

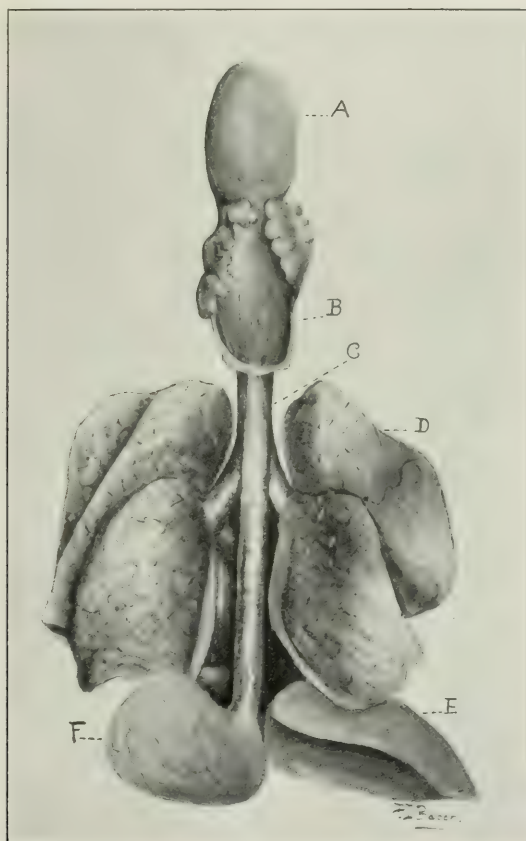
observed that the infant became asphyxiated at intervals of thirty minutes to an hour, which condition was promptly relieved by the removal of a large quantity of yellow mucus from the pharynx. The lower end of the crib was elevated and with the mucus flowing



CASE 1.—Esophagotracheal fistula. Anterior view. A. Tongue. B. Larynx. C. Blind esophageal pouch. D. Lungs. E. Stomach. F. Trachea. G. Liver.

from its mouth no spasms occurred. The baby nursed as if it were very hungry but only for a few minutes, at the end of which time it choked, became asphyxiated and was relieved only when its head was lowered. In view of the fact that he had observed a similar case one year ago Dr. Truesdell, of the staff, made a diagnosis of the exact condition in the upper part of the esophagus. This diagnosis

was confirmed when it was found impossible to pass a catheter further than 10 or 12 cm. from the alveolar border. With a No. 16 F. in this position a radiograph was taken which showed the level of the lower end of the sac. The patient gradually lost weight and on the eighth day a gastrostomy was performed and feeding was carried on through a tube. It was later noticed that milk placed



CASE 2.—Esophagotracheal fistula. Posterior view of viscera. A. Tongue. B. Blind esophageal pouch. C. Point of communication between esophagus and trachea. D. Lungs. E. Liver. F. Stomach.

in the stomach regurgitated into the mouth. Meconium was passed the first three or four days after birth but thereafter there was little or no stool. The child developed pulmonary signs and died on the tenth day of inanition and bronchopneumonia.

At autopsy the esophagus was observed to begin at its normal position but terminated in a blind pouch $3\frac{1}{2}$ cm. lower down and $2\frac{1}{2}$ cm. from the bifurcation of the trachea. This pouch was 1 cm. in diameter, its walls were hypertrophied, its lumen dis-

tended, and there was no communication with the stomach. The stomach was normal in size and position and contained some food particles. There was a wound in its anterior wall 1 cm. in length and 1 1/2 cm. from the pylorus. From its cardiac end the esophagus took its normal position and course upward and terminated at the bifurcation of the trachea with which it formed an anastomosis. Its lumen was patent and communicated with the trachea and bronchi. The intestines were for the most part empty and there was a small diverticulum of the ileum about 10 cm. from the cecum.

With the anatomical condition present there is no doubt but that the thick yellow mucus always present in the pharynx had its chief source of origin in the stomach and as soon as the blind pouch of the esophagus was filled up the baby became asphyxiated. It is also true that food taken by the mouth was not all that entered the lungs for after the gastrostomy was done food regurgitated from the stomach into the bronchi. Thus it seems that in these cases gastrostomy affords little or no relief unless the cardiac end of the stomach is closed. In many of these conditions in which the esophagus ends in a blind pouch there is a fibrous cord extending from it to the cardiac end of the stomach; in others there are a few muscle fibers running from the termination of the sac downward on the posterior wall of the trachea. Then there is a third variety in which there is absolutely no traceable connection with the stomach. Cases have been reported where the rudimentary esophagus is from 2 1/2 to 4 cm. in length, and again the fistulous communication with the trachea does not always take place at its bifurcation but unites with its posterior wall 1, 2 or 3 cm. above it.

Dr. Losee stated in this connection that such a case was observed in the hospital about one year ago with exactly the same symptoms as here reported, and that at autopsy the same anatomical conditions were found except that the lower portion of the esophagus communicated with the posterior wall of the trachea 1 cm. above its bifurcation. These infants all die from two to twelve days after birth regardless of any treatment.

Embryologically this condition may be explained by the fact that the proximal and distal portions of the esophagus have different sources of origin. The buccal cavity, pharynx and upper extremity of the esophagus are developed from the ectoderm and the intestinal tract, including the distal portion of the esophagus and the respiratory apparatus, from the entoderm. Fistulous communication between the esophagus and trachea are almost always situated at its bifurcation and the conclusion may be drawn that the membrane separating the esophagus and trachea closes last at this location.

The speaker thought that such cases as these should be invariably reported in order to keep ever present in the eyes of the attending physician the occasional occurrence of these anomalies so that an early diagnosis and definite prognosis may be made.

DR. EDWARD D. TRUEDELL presented a series of lantern slides illustrating

FURTHER OBSERVATIONS ON BIRTH FRACTURES IN THE SERVICE OF THE HOSPITAL.

Three more cases of birth-fractures have been added to the series of eleven already reported in the *Bulletin of the Lying-in Hospital*, volume viii, No. 4. Of the entire series of fourteen, three have died, the remainder having been under constant observation during a period of eighteen months. These have been closely followed as before, and their progress toward complete restoration watched with much interest. Frequent x-ray examinations have been made and where union with deformity had occurred, this permitted inspection of the bone during the process of straightening, as nature moulded the bone into a form indistinguishable from that of the uninjured side. Of the fourteen fractures, ten had taken place during version and breech extraction, three during simple breech abstraction, and one in a spontaneous vertex delivery in which difficulty was experienced in extracting the anterior arm from a narrowed pelvic outlet. The line of fracture in all cases but one was practically transverse in direction, a typical pipestem break, the site of fracture being at or near the center of the shaft of the bone, apparently just below the insertion of the deltoid muscle. The exception to this rule was a case in which a fillet had been applied to the prolapsed arm in a shoulder presentation and traction maintained on this during the performance of the version. This fracture is supposed to have been produced by torsion of the arm across the child's back, and in this instance the line of fracture was oblique. Deformity was absent at the first observation in some instances, but this as a rule appeared to some degree quite promptly, due to necessary handling of the infant or to the infant's own activity. The more common type of deformity was an external angulation, in some cases of alarming degree, evidently aided by the deltoid pull. The second type observed was a lateral displacement, the fragments lying parallel, but at some little distance from each other. Overriding was conspicuously absent. Wrist drop has been noticed accompanying every fracture. As these fractures are produced by pressure brought to bear upon the posterior aspect of the humerus in a forward direction, causing the fracture to take place away from the nerve, this evidence of nerve injury is not readily explained. As it has in each case been present from the first it cannot be due to either callus formation or pressure of extravated blood. It may be that sufficient pressure has been brought to bear on the nerve as this crosses the posterior surface of the bone to cause a traumatic paralysis before the bone itself gives away. Although the fracture takes place away from the nerve, the nerve is certainly implicated in some manner. Another infant with fractured humerus which died in the first twenty-four hours of associated injuries, has afforded a second opportunity for examination of a fresh fracture by dissection. Extensive extravasation of blood was found in the deeper portion of the subcutaneous fat and beneath the deep fascia, between the muscle planes. There was no evidence of violence to the brachial

vessels or to the musculospiral nerve. There was an extensive tear in the periosteum anteriorly, through which the bone ends could readily be made to protrude. The bleeding had taken place from the fractured bone ends, the torn periosteum, and surrounding lacerated muscle. The fracture was located just below the insertion of the deltoid. For the treatment of these cases a splint was devised which has seemed more satisfactory than other appliances formerly tried. This was made of sheet lead, cut and folded in such a manner that, with the forearm flexed upon the arm, the upper fragment was pressed inward and the lower fragment outward. At the same time the fragments were immobilized, thus meeting the indication in either type of deformity. An extension of the splint across the infant's back fixes the whole arrangement to the body, immobilizing the entire arm. Later sheet aluminum was substituted for the sheet lead, which, while less readily moulded and more resilient is permeable to x-rays, permitting examination through the dressing.

From reading the radiographs alone it would seem that it did not matter how badly these cases were put up or whether they were ever put up at all. Apparently nature at this time of life is equal to dealing successfully with any degree of deformity in the upper extremity. However, the demand for the relief of pain is at hand and with the application of a retention dressing deformity, if present, should be overcome as far as possible. No case of nonunion has occurred, although this might be possible in the presence of excessive deformity and absence of immobilization. Union has been firm in three weeks in the majority of cases, at which time the wrist drop has usually disappeared. In one of the later cases the wrist drop was still marked at the end of six weeks. In two cases the attempt at callus formation was feeble and nonunion was feared. These cases progressed slowly to firm union. In one of them both humeri are decidedly attenuated at the fifteenth month, the bone appearing less compact than in the average case. This same patient has as yet no teeth.

The striking feature in studying these fractures of the humerus has been the evidence of nature's ability to completely eradicate deformity apparently of an extent sure to be permanent when looked at during the first three months of life. It has proved that it is unnecessary, if not actually wrong, to refracture these bones before the second year of life. Even if union will take place rapidly and surely during this time, nature is capable of treating these cases efficiently, while a fracture of the humerus at this age is so difficult to dress satisfactorily that it is not likely that the result of the second attempt will be any better than the first.

The case of Erb's paralysis complicated by fractured humerus has been followed with great interest. The repair of the fracture itself took place as promptly as in the other cases. There was a slight degree of external angular deformity. At the end of eleven months there was but slight improvement in the paralysis. There was no voluntary movement of the arm while the forearm had improved to the extent of feeble voluntary flexion. The bone showed

slight outward curvature. It was noticeable that here nature had done less to eliminate deformity in eleven months than in similar uncomplicated cases. The bone was also slightly attenuated as compared with its fellow of the opposite side, while its lower portion was somewhat less dense. One week after this observation, the child fell from its sister's knee to the floor, a distance of about 18 inches, refracturing the same arm at the same place. The new fracture had the appearance of a duplicate of the original, the chief difference being in the size of the bone. This susceptibility of the bone may have been due to trophic nerve influence, or to disuse of the limb because of the paralysis, or to both influences. Certainly numerous children experience similar tumbles without corresponding consequences. Five weeks after refracture there was very little callus formation and union, if it takes place, will probably be of the fibrous type.

Ten cases of fracture of the clavicle have been under treatment, and followed, although not so closely as have been the cases of fracture of the humerus. Eight of these have occurred during version with breech extraction, one during a forceps delivery, and one during a normal vertex delivery, the fracture not being discovered until some time later when the mother happened upon the callus mass. The fracture is usually situated at about the middle of the shaft of the bone, or at the juncture of the middle with the outer third, at a point corresponding with the transition of the prismatic to the flattened portion of the bone, a distinction not so clearly made in the newborn. Displacement has been but slight in most cases, moderate in a few. This has been of the sort usually observed in adults, the inner fragment being displaced upward, the outer downward and inward. No complicating injuries have been noted. The fracture has been treated simply with a Velpeau bandage in most cases, in others by means of a figure-eight bandage across the back. Union has taken place promptly in all cases, usually with the formation of a visible callus mass. The final results have been good, both as regards function and the restoration of the normal contour of the bone itself. One case of birth fracture of the clavicle seen by the writer had failed to unite at the fifteenth month, a false joint having been formed at the point of fracture, and the outer fragment being much atrophied. This might seem more likely to occur in the clavicle than in the humerus, since the fracture usually takes place to the outer side of the portal of entry of the nutrient artery, and the extremities of the bone are less liberally provided with secondary blood-vessels than are those of the humerus.

Two cases of fracture of the femur have been under observation. The first occurred during version and breech extraction. This case was treated by the House Surgeon of the Out-door Division by means of coaptation splints and bandages, no attempt at extension being made. Furthermore no x-ray examinations were made at the time. Upon examination at the eighteenth month the child was observed to limp, the gait being of the waddling type seen in cases of dislocation of the hip. The injured leg was found to be fully a half inch shorter than that of the other side. Radiographs showed no angulation

laterally although the upper portion of the shaft of the femur was thickened and the bone appeared more compact. On lateral inspection the bone showed a well-marked anterior curvature, easily accounting for the shortening of the entire limb. The second case came under our care when one month old. The mother had been delivered by a midwife. The labor had been an easy spontaneous one, but the infant when born did not begin to breathe so promptly as was thought desirable by the attendant who consequently grasped the child by the ankles, swung it around in the air and fractured its right femur. The injury had gone entirely untreated up to the time of admission to the hospital. Union was firm and the radiographs showed excessive angular deformity, both externally and anteriorly associated with well-marked overriding. Callus was abundant and firm, and so freely interposed between the fragments that it seemed best to be content to correct, if possible, the external deformity only. This was done partly forcibly and partly by continuous traction. A long side splint was applied and firm traction thus maintained for three weeks. There was some improvement in the deformity under this treatment. Three cases, one treated not at all, and the other inefficiently, show the tendency in this injury not only to excessive angular deformity, but to overriding that may result in permanent disability due to shortening of the femur, particularly if the child becomes rachitic later in childhood. In the child of eighteen months the outlook is doubtful. It seems unlikely that the deformity will decrease now that the child has begun to walk. If this is so the leg will probably be permanently shortened, and some effect upon the gait may persist. Cases of fracture of the humerus have shown progressive obliteration of the deformity as long as these cases have been under observation, now eighteen months. But functional demands are far less severe in the case of the humerus than of the femur. These fractures of the femur in infants demand traction for the relief of overriding, as do corresponding fractures in adults. A long side splint can be employed arranged to provide extension by means of adhesive plaster straps applied from the site of fracture to the ankle and if necessary, coaptation splints can be applied in addition about the thigh itself to counteract the tendency to angular deformity.

The series of infantile fractures described herewith occurred during a period of one and one-half years in all the services of the hospital out of a total of about 9000 cases delivered.

DISCUSSION.

DR. LEON T. LEWALD said that while it was not difficult with modern apparatus to make an instantaneous radiograph of an infant, yet to duplicate the results which Dr. Truesdell had obtained in his large number of cases showing the progress and final result in each case, showed great patience and skill. It was of interest to all to note how union had occurred, even in cases showing considerable separation of the fragments. A good prognosis could

therefore be given in this class of fracture if reasonable care was taken in the treatment.

DR. ROSS MCPHERSON presented a

STATISTICAL REVIEW OF THE WORK OF THE LYING-IN HOSPITAL FOR
THE PAST FIVE YEARS.

During the past five years the Lying-In Hospital has taken care of 26,997 confinements and attended 27,326 births. During this time there have been 225 cases of placenta previa, making the frequency of this complication 0.8 per cent. of all cases. There were 204 cases of eclampsia or a frequency of 0.7 per cent. There were thirty-six deaths of mothers in eclampsia or 17.65 per cent. of all deaths in confinement. The total number of deaths of mothers was 302 or a mortality of 1.1 per cent. The total number of stillbirths was 1213 or 4.06 per cent. The total number of ectopic pregnancies was fifty-eight or 0.21 per cent. The number of hydatidiform moles was seventeen or 0.06 per cent. The total number of abortions was 1310 or 4.9 per cent. The total number of twins was 314 or 1.19 per cent. The number of triplets was ten or 0.04 per cent.

ADDITIONAL EXPERIENCE WITH THE DIALYZATION METHOD FOR THE
SERODIAGNOSIS OF PREGNANCY.

DR. C. F. JELLINGHAUS and DR. J. R. LOSEE presented this communication.

The dialyzation method for the serodiagnosis of pregnancy is difficult, not because of any one detail but because of the very many details, a break in any one of which will spoil the test, no matter how perfectly the rest of the technic has been carried out. For example, when a dialyzer is filled with nonpregnant serum and placenta, and the mixture is covered with a layer of toluol, if any small particle of placenta remains on the inside wall of the dialyzer without being covered with toluol, this particle will putrify during the sixteen hours in the incubator, amino-acids will be formed and thus the test will be spoiled. Another very important step is the boiling of the 10 c.c. of dialysate with 0.2 c.c. of a 1 per cent. solution of ninhydrin. This amount of ninhydrin does not react to very small quantities of amino-acids, such as are found in the dialysate of even nonpregnant cases, when the latter is boiled one minute. But even when boiled one minute the amount of evaporation may differ depending upon the flame, etc. It is, therefore, important that the evaporation should always be the same, especially in the test proper and control of a given case. To ascertain the amount of evaporation the fluid that is left after boiling one minute is measured. If this is not done we can readily fall into the following error. Given a nonpregnant serum to test, the control of placenta and inactivated serum comes out negative, while the serum plus placenta comes out positive. This result might lead one to condemn Abderhalden's claim

unless the fluid remaining after boiling be measured, if measured the control may show 6 c.c. left, while the dialysate of placenta and serum shows but 5 c.c. left, after boiling one minute. In other words, not Abderhalden but the method of boiling was at fault. And so we may go on and mention innumerable possible pitfalls.

This paper will be published in a more complete form later.

DISCUSSION.

DR. RALPH C. STILLMAN said that this method was of the greatest importance not so much as a method for the diagnosis of pregnancy but because it furnished good confirmatory evidence of Abderhalden's theory. Abderhalden's theory was apt to hold an important position in the development of theories of immunity and also in certain branches of physiology; the authors had done well to select a test the accuracy of whose findings were susceptible of positive demonstration. The application of this method would rapidly widen as time went on.

DR. C. F. JELLINGHAUS said that in the dialyzation method for the serodiagnosis of pregnancy the work was difficult not because of any one detail but because the break in any one detail spoiled the general test. A point he wished to emphasize was the boiling for one minute; it was a great mistake in boiling the contents of the dialyzer too long.

DR. J. R. LOSEE, in reply to a question in regard to the late toxemias of pregnancy, said that this reaction was more intense in eight of their cases of eclampsia, but it was not of great diagnostic value. He hoped that they would soon be able to graduate their results so that they might be of more value.

DR. JAMES A. HARRAR read a paper entitled

INTRAVENOUS INJECTIONS OF WEAK SOLUTIONS OF MAGNESIUM IN PUERPERAL INFECTION

of which the following is an abstract.

The use of magnesium sulphate intravenously for the treatment of puerperal infection was first proposed by R. R. Huggins in 1910. In 1911 R. W. Lobenstine reported a case of streptococcemia cured by the method. Harrar has now employed the injections in fifteen cases of severe puerperal infection, the bacteria having been demonstrated in the blood of six by repeated culture.

A 2 per cent. solution of chemically pure magnesium sulphate is prepared with freshly distilled water. This is filtered and sterilized in half liter flasks in an autoclave. This solution will not hemolyze human red blood cells suspended in salt solution, and from experience in over 100 injections, will not cause any rigor or temperature reaction in the patient. A simplified salvarsan apparatus is used and 300 or 400 c.c. of the solution is run into a vein of the arm. The injections may be repeated daily or at longer intervals. Thirteen in-

jections were given in one case. The effect upon the bacteremia may depend upon an agglutination of the streptococci or may depend merely upon the increased bulk of body fluid and alteration in surface tension of the body cells. Harrar reports the recovery of four women who had hemolytic streptococci in their blood out of the six with positive blood cultures. In the cases of streptococcic toxemia but with negative blood cultures there was evident improvement after the injections. The value of the method for the present must depend more upon the clinical observations than on any theoretical consideration. In forty-six cases of bacteremia previous to 1910 in the hospital the mortality was 93 per cent. In the six cases treated with magnesium sulphate since 1910, the mortality has been reduced to 33 per cent. The method is harmless if the injections are made very slowly and in the proportions described. The technic is simple and the materials cheap as compared with the use of antistreptococcic sera and the preparation of autogenous vaccines. The method appears to be of more value early in the course of the blood infection before secondary localization has occurred. The cases are obviously few in number, but four consecutive successful cases of puerperal bacteremia out of six is a distinct improvement over any form of treatment in vogue at present.

DISCUSSION.

DR. SAMUEL J. MELTZER said that he had been especially interested in Dr. Harrar's report and experience with the use of magnesium sulphate in the treatment of puerperal streptococcemia. The introduction of magnesium sulphate intravenously is not without danger, especially if the ratio of the infusion is not taken into consideration. Even a 2 per cent. solution might endanger the respiration if injected rapidly. From our recent laboratory experiments we have reasons to suspect that fatty hearts might not stand well intravenous injections of magnesium salts even if carried out slowly. The intravenous injections cannot be compared with the intraspinal. In the latter injections very small quantities are used and the results are due to a local effect upon the central nervous system. On the other hand, we have no other remedy for the ill effects of the intraspinal injections except artificial respiration while against the toxic effects of the intravenous injection of magnesium we have an excellent remedy in the intravenous injection of calcium. The antagonistic action of the two salts is a marvelous one, and those who use intravenous injections of magnesium should familiarize themselves with this action. Dr. Meltzer cannot find any plausible explanation for the favorable action of the magnesium injection in puerperal fever. Magnesium salt is not bactericidal. In half a dozen of experiments upon rabbits infected with virulent streptococci, there was no evidence of a favorable action of magnesium injections. Of course reliable critical clinical observations are just as good as laboratory experiments. But in clinical obser-

vations a dozen cases do not prove much. It should further be considered, whether it is not simply the water which brings about a favorable result. A report was recently published of a large number of puerperal cases, 130 or more, which received merely injections of water with very satisfactory results. Perhaps the presence of magnesium salts adds to the diuretic effect of the water, and thus relieves the circulation of toxic products of the broken down streptococci.

DR. J. A. HARRAR closed the discussion. He said that he believed it was always dangerous to draw definite conclusions from a few clinical observations. The exact value of the procedure was not yet proved. Magnesium sulphate did have one special action upon streptococci, it agglutinated them in saturated solution after an hour's incubation at 37° C. In culture growth it had no bactericidal action. It was necessary to prepare a homogeneous emulsion for agglutination tests, as streptococci grew in clumps and masses. The results immediately following the injections in some fulminating cases of streptococci toxemia were impressive. One case of streptococcic bacteremia recovered after ten injections without secondary localization. Another case of bacteremia recovered after six injections, also without development of secondary localization. The other two cases of bacteremia were rather prolonged. One had an embolus in the pons with crossed paralysis and was in the hospital 160 days. The two patients that died were desperately ill on admission and went rapidly to a fatal termination; but they were helped by the magnesium injections for the time being. One developed panophthalmitis just before death. The other patient had an intense hematogenous jaundice.

TRANSACTIONS OF THE WASHINGTON OBSTETRICAL AND GYNECOLOGICAL SOCIETY.

Meeting of February 14, 1913.

DR. VAUGHAN *in the Chair.*

DR. J. WESLEY BOVEE presented a specimen of

ADENOCARCINOMA OF THE BODY OF THE UTERUS.

removed from a white, married woman fifty-three years of age and weighing about 120 pounds. She had had five children, all normal births, the last occurring in 1891, and had no other pregnancies. In 1907 her menses became profuse and irregular, at times ceasing for two or three months only to return more profuse than ever. Since 1910 a varying, profuse leukorrhea accompanied with a dull pain in lower left quadrant of the abdomen has been present. These symptoms have increased steadily to date. Since November, 1912, the patient has been flowing continuously with the exception of two remiss-

ions of one week each, after which the quantity was increased. The uterus was slightly enlarged, a little softened and movable; the appendages were slightly enlarged. The blood picture was as follows: white cell count, 7200, red cell count, 4,470,000, hemoglobin, 85 per cent. and blood pressure, 120. Abdominal panhysterectomy was performed this morning after the uterus had been injected with tr. of iodine, 3 1/2 per cent. After removal there were found springing from the fundus and left side of the body and projecting into the cavity several nodular projections of adenocarcinoma.

DR. BOVEE also presented a specimen of

MULTIPLE FIBROMATA UTERI COMPLICATED WITH CARCINOMA CORPORIS UTERI

removed this morning from an old, colored widow who entered the hospital to be treated for a profuse, malodorous leukorrhea. She had had one child, her only pregnancy, after normal labor and in 1903 an uneventful menopause. In November, 1911, she had a profuse, vaginal bleeding, passing numerous clots, which was stopped by local treatment. September, 1912, she first noticed a profuse, malodorous leukorrhea and a dull pain in hypogastrium, most severe on the left side. These symptoms continued irregularly but persistently to the date of her admission. Examination: the patient appeared to be sixty-five to seventy years of age and was thin and feeble; the abdominal wall was thin and through it was seen a large irregular mass reaching from the pubes to above the umbilicus. The vagina was relaxed, the cervix appearing only as a little dimple in the roof, and the visible mass mentioned was found to incorporate the uterus and was firm and nodular and movable to a slight degree.

There was nothing abnormal noticed regarding the temperature, pulse and respiration. The blood picture was as follows: blood pressure 116, hemoglobin 85 per cent., white cell count 8460, red cell count 3,825,000. An abdominal panhysterectomy was done removing a large nodular fibromatous mass including uterus. Many easy separable but old adhesions were encountered. The vermiform appendix was found to be markedly enlarged, nonpatulous, adherent and containing two cysts and a nodular tip apparently tubercular. These cysts each contained about 20 to 30 minims of a viscid, grayish-white material. The tip of the appendix mentioned was globular and about 3/4 inch in diameter and was first suspected as being a carcinomatous metastasis from the uterus. In opening the large mass, the cavity of the uterus, about 6 inches in length, was found to contain what seemed to be a carcinomatous mass involving the mucosa and muscular layers of the fundus. It was soft and disorganized and extended nearly to the peritoneal coat. Lower in the cavity was found projecting what might be termed a restless submucous fibroid. When the uterus was opened a very notable stench was observed. These specimens were presented fresh and without microscopical reports because of their being specially fine fresh specimens. The microscopical findings

will be later filed. Both patients passed through their operations finely.

DISCUSSION.

DR. MILLER said that the first case presented by Dr. Bovée was probably correctly diagnosed and would be cured by the operation. In the second case, however, he considered the degeneration to be more probably sarcomatous than carcinomatous as the only fibroid which could from a histological conception become a sarcoma was an adenofibroma and such did not seem to be the case in this specimen.

DR. STONE called attention to the age of the patient as having to be considered at times in the differentiation between carcinoma and sarcoma but that such was not often the case in association with fibroids. Recently he had removed a uterus in which there had been present carcinoma of the body and fibroids but the two involved areas in the uterus had not been in contact.

DR. BOVEE spoke of the occurrence of carcinoma in a fibroid when the Fallopian tube or a duct of Gaertner was involved as well as in cases of metaplasia.

DR. H. H. DONNALLY presented the report of

ANOTHER CASE OF FACIAL PARALYSIS COMPLICATING ACUTE OTITIS MEDIA.

A little over two years ago I presented to this Society a paper upon facial paralysis in infants and children, and reported a case in a little girl of two years eleven months which occurred in association with acute otitis media. She was a victim of enlarged tonsils and adenoids upon which her acute otitis media depended. Five weeks after the onset of facial paralysis, which was complete, there was entire restoration of function and no difference could be recognized between the two sides of the face. Recovery was spontaneous as paracentesis was not done.

Since then I have encountered three other cases of facial paralysis in each of which there was an acute otitis media of the same side as the paralysis. The first of these was in a child at the Children's Hospital which was regarded by Dr. Leech as possibly an infantile paralysis affecting only the face muscles on one side. Acting upon the suggestion to have the ears examined, he told me later that the ear on the affected side was acutely inflamed and no doubt accounted for the affection of the seventh nerve. The second case of Bell's palsy was in the person of an interne at the George Washington University Hospital. His ears were examined at once and the one on the affected side found to be inflamed. He also recovered in the course of a few weeks without paracentesis.

The third case I wish to present tonight making, with the case presented with my original paper, four in all.

Lewis L., aged seven years, white, male, Russian, living at 532 4 1/2 St. S. W., came to the Children's Hospital, January 11, 1913. His family history was good, his birth weight was 9 pounds he was breast fed for a year, but he had not thrived nor been a strong child. He had had bronchitis, chicken-pox, whooping-cough, and diphtheria, with good recoveries in all cases. His present illness dated from the day before, when his parents noticed in the morning something wrong with his face, like it was swollen, and one corner of his mouth drooped.

On examination he was found to be rather poorly developed and moderately well nourished. A striking paralysis of the left face was present involving the superior, middle and inferior branches of the seventh nerve, causing inability to wrinkle the left side of his forehead, close the left eye or move any of the other left facial muscles. Rhinitis and probably adenoids were present. The throat was very red and the pharynx granular with somewhat enlarged tonsils. The left membrana tympani was dull and pink to red in color, most noticeable in the posterior superior quadrant. On incising it a bloody fluid escaped. The right ear was normal, and there was nothing else noteworthy in the physical examination.

One week later the facial paralysis was disappearing, while one month later no trace of impairment of function could be seen.

From observation of the four cases of facial paralysis which I have seen in the past two and a half years, the conclusions of Dr. Reik are supported as far as the cases go. He says that 70 to 75 per cent. of such cases are generally credited to cold and are spoken of as refringeratory or rheumatic facial paralysis, but that "there is always an intermediary subacute otitis media between the time of exposure to cold and the appearance of the palsy. In every case of this disease it is your duty to make or have made a careful examination of the ears, not alone for suppurative afflictions of that organ, but, more particularly, for mild exudative middle-ear disease. There is abundant proof, both clinical and anatomical, of the relationship between the ear affection, as a stage of the disease, and the paralysis, which not only makes clear the pathology, but provides an easy and promising form of treatment. Prompt aural treatment will cure the paralysis, and the rapidity of cure depends upon how early middle-ear treatment is instituted."

It is only upon this last point that there exists any doubt in my mind, for in this small number of cases which I present, paracentesis has not seemed necessary a single time to secure relatively prompt recovery.

DISCUSSION.

DR. WILLSON called attention to the cases of otitis facial palsy that were confused with the facial palsy of infantile paralysis. Two years ago he had seen a case of unilateral facial paralysis associated with bilateral otitis. The ear drum on the side of the paralysis was normal while the drum on the opposite side was destroyed.

When the child got out of bed she walked weakly and the condition was called poliomyelitis. The facial palsy is still present.

DR. CARR thought that the otitis offered a rational explanation of many cases of facial palsy that lasted but a few weeks.

DR. BOVEE called attention to the recognition of facial palsy in cases of chronic otitis.

DR. ACKER thought it perfectly possible to have cases of Bell's palsy without any ear involvement. The cases of facial palsy in association with poliomyelitis were not rear.

DR. NEILL reported the case of a woman of eighty-five years who had a paralysis of face, arm and leg associated with Cheyne-Stokes breathing. She was unconscious for three days, then her temperature rose to 103° . Two days later the ear discharged and the paralysis cleared up.

DR. DONNALLY thought that the poliomyelitis cases usually showed other paralyses beside that of the face. He quoted Riker as saying that facial palsy without ear disease or poliomyelitis did not exist. That the ear was affected was evidenced not by drum appearances but by the decrease in hearing and in sound conduction.

DR. PRENTISS read the essay of the evening on

LUMBAR AND SACRAL BACKACHE IN WOMEN.*

DR. CARR emphasized the distinction between muscle pain, ligament pain, and pelvic organ pain, and also the constitutional causes such as neurasthenia, colonic intoxication and others. The muscle pains were due to overwork or from faulty position in sitting with consequent overworked ganglion cells in the spinal cord and hyperemia. On the other hand, the changes in the nerve cells caused atrophy of the muscles and so the vicious circle of causal relation between nerve and muscle developed. The diagnosis was to be made by excluding pelvic trouble, finding the abnormal posture and the small muscles. Relaxation of the ligaments and subluxation of the joints was also recognized and the diagnosis confirmed by response to treatment in the support of the joints.

DR. STONE said that the public considered all backaches in women as due to pelvic trouble and that if the laity was educated away from the idea that all backaches were of pelvic origin much gynecology would be eliminated. He spoke of the frequency of the occurrence of headache in the back. In the neurasthenic cases there is usually a single small point of tenderness and pain. In one nervous woman with severe pains in the back, on pelvic examination he found the uterus normal and a minute erosion of the cervix with a slight leukorrhea. We touched the cervix with iodine, assured her that the pain would go, and after two or three the attempts the pain was gone.

DR. SHANDS spoke of the neurasthenic cases as treated by rest to the spinal muscles, by mechanical support and also by the vivid mental impression from the application of the Paquelin cautery.

* For original article, see page 115.

In the cases of Pott's disease of the lumbar column there rarely was any marked deformity and yet the pains were definite. The relaxed sacroilac joints also gave severe backaches.

DR. BOVEE spoke of the high heel shoe as causing muscle strain. Imperfectly fitting corsets also caused pain. But, on the other hand, high-heeled shoes and tight, properly fitting corsets relieved certain muscle aches in the back. He thought the cautery of the spine had more than a mental effect, just as the mustard plaster by its counterirritation gave very definite results.

DR. THOMAS spoke of the postural backaches from relaxed back muscles and their response to treatment by the osteopaths by massage of the deep back muscles.

DR. MILLER thought that the gynecological side of the question should not be forgotten because certain pelvic conditions were well-recognized causes of backache, namely, retroversion, hemorrhoids, cystitis, fibroids and pelvic tumors. He thought the majority of cases of sacral pain were due to pelvic conditions.

DR. CARR said that localized sacral pain was frequently due to endometritis which was more important than an accompanying retroversion.

DR. BOVEE considered retroversion *per se* as symptomless but the endometritis accompanying the retroversion commonly gave symptoms.

DR. WHITE called attention to the postoperative backache from strain on the ligaments under general anesthesia. This type of backache could be prevented by putting a pad under the back.

Meeting of March 14, 1913.

The President, DR. SPRIGG, in the Chair.

DR. F. W. LAWSON reported a

CASE OF HYDATIDIFORM MOLE.

As an interne in Columbia Hospital I once had an excellent opportunity to observe a case of hydatidiform or vesicular mole presenting typical text-book features. Owing to the nonarrival of her attending physician I was present when the mole was expelled and as the specimen seemed perfect I suspended it entire in a preserving solution and later presented it to the Army Medical Museum.

While this case was still quite fresh in mind I had occasion on June 18, 1908, to see a colored woman who gave the following history:

Patient was twenty-six years of age and had given birth to three children during the preceding seven years. Two died soon after birth and the last was a stillbirth born eighteen months ago. Her last menstruation began March 1, 1908, and lasted three days as usual. Previous to this time she was perfectly well and had not been troubled with any pelvic disorders. During March and April she had morning nausea as in her previous pregnancies but observed no vaginal discharge nor other abnormal symptoms. On June 1,

after a hard day's work, she noticed a bloody flow, which from that date until June 15 was present every night but rarely noticed in the daytime. She had no pain and did not feel sick. From June 15 to June 18 she had a constant flow and frequently felt very faint.

Examination on June 18 showed a soft uterus much larger than was expected from the history, nothing particularly abnormal about the cervix, and some bloody discharge. The presence of a vesicular mole was suspected from the previous experience referred to, but owing to the relative infrequency of this condition treatment for threatened abortion was instituted.

The patient remained in bed most of the time from June 18 to June 30 having at times considerable flow and at irregular intervals weak labor pains, which were always readily checked by bromides. During the evening of June 30 she had rather hard labor pains and apparently had lost a great deal of blood.

When seen at 2 A. M. the next morning her pulse was 110 and she seemed greatly exhausted. Stimulants were administered and in a short time she showed marked improvement. At 4 A. M. she expelled the specimen here exhibited. It contains no trace of a fetus. Hemorrhage ceased after the expulsion of the mole and the patient recovered without infection or other mishap.

Twenty days later the patient had a sensation of fulness in her pelvis and subsequently passed about 6 ounces of clotted blood. Having read about that time several startling articles about syncytioma malignum, I thought it necessary to get the patient at once into a hospital for radical operation and with difficulty persuaded her to go. She entered the hospital, remained there about one hour, and then left by the back door minus most of her wearing apparel and without having signed the usual statement in which she assumed full responsibility for her own conduct, etc.

She has remained perfectly well ever since.

It is not expected that the report of this case offers to this society anything exceptionally remarkable or particularly instructive. Perhaps some member may supply these features by reporting the presence of a vesicular mole in an ectopic sac or by clearing up the etiology of the disease. Probably the most generally accepted theory of causation is that of a preexisting endometritis. No history of that kind was obtainable in this case but it was scarcely possible to exclude it. It would seem that most cases of vesicular mole recover if the patient is left alone. Interference is apt to cause infection to which these patients are said to be very susceptible and may easily cause perforation of the uterus. Spontaneous perforation is rare and malignant degeneration does not often follow. Hemorrhage is the greatest danger and emptying the uterus artificially may of course be necessary to control this.

Not long ago I obtained an almost identical history from a patient and found a large soft uterus. Naturally I suspected hydatidiform pregnancy, but several months later was present when the patient gave birth to twins and expelled a normal after-birth. Attempts at abortion were finally admitted as the cause of the hemorrhages. In

this case, moreover, the patient was ill and had a marked albuminuria in addition to the anemia.

DISCUSSION.

DR. STONE in discussing the case thought the mortality reports exaggerated only a few of the cases developed into malignant moles.

DR. SPRIGG had seen one case some fifteen years ago which after passing the size of full period of pregnancy at six months delivered herself of a bucketful of mole and fluid. She developed a number of small ovarian cyst that grew rapidly, were removed by Dr. Stone through the gavage and never recurred.

DR. LAWSON thought that hydatid pregnancies usually had a normal recovery though half the cases of chorioepithelioma were said to be preceded by hydatids.

DR. STONE reported a case of

A SECOND TUBAL PREGNANCY IN THE SAME PATIENT.

Mrs. J., white, aged thirty-two, married five years without children, was seized with severe pain in the left ovarian region and with great shock followed by syncope before she could obtain the services of her family physician (Dr. W. T. Gill of this city).

Prompt operation with the introduction of normal saline solution in the left median basilic vein, saved the patient who remained in excellent health for almost five years. The second attack occurred on Feb. 1, with very similar symptoms but with less severity than attended the first seizure. Dr. Gill saw the patient and made a diagnosis of tubal pregnancy, which was confirmed later at the operating-table. On opening the abdomen we were at first unable to find the source of hemorrhage which appeared to be of recent origin without much coagulation. The right tube and ovary were absent and the left tube was so small and tortuous as to suggest the impossibility that it could be the seat of the pathological process. The great quantity of blood made it difficult to bring the suspected tube in position for inspection, and at first we could only clamp the vessels and proceed to empty the abdominal cavity of blood. Finally a small mass of tissue was found attached to the fimbria which indicated the seat of the lesion in the pavilion of the tube. The most diligent search failed to show another possible source of hemorrhage and we reluctantly abandoned further search. The examination, however, showed chorionic villi in the mass of clot found and hence all doubts about diagnosis are removed. The small size of the left Fallopian tube is worthy of special notice. Its tortuous canal had probably resisted the entrance of the ovum into the uterine cavity although its appearance was otherwise not distinctly pathological. We left the corresponding ovary, and amputated the tube. At about its middle portion. This case represents the second time only that we have seen a second ectopic pregnancy in the same patient. Other reporters have seen several, Dr. Stewart McGuire having recently reported five in his practice.

DISCUSSION.

DR. BOWER had anesthetized during the past year three women operated on for a second tubal pregnancy, one following in eight months, one after an interval of ten months, and the other after two or three years. Two of the women had made their own diagnosis.

DR. MILLER said that the subject of repeated ectopic pregnancy had been worked up by Dr. Smith of Grand Rapids. The question of great importance was how to treat the first operation to avoid the second ectopic pregnancy.

DR. ABBE asked whether there were any cases of normal pregnancy between two ectopic pregnancies which would show that one ovum had passed through a tube that later could be only partially traversed by an ovum.

DR. SULLIVAN called attention to a case of second ectopic in the same tube where at the first operation there had been found a tubal abortion from the fimbriated end of the tube.

DR. THOMAS remembered hearing a report of a second ectopic in the same tube. The case had been reported at the meeting of the Southern Surgical Society several years ago.

DR. NEILL read the essay of the evening on

TREATMENT OF RETROVERSION.*

DR. LOWE spoke of the preventive treatment of retroversion.

DISCUSSION.

He thought the persistent dorsal position after labor the most common cause, frequently associated with a torn perineum that had not been repaired. The primary suture of the perineum and early change of posture after labor would help to prevent retroversions. Bimanual reposition some six weeks after labor would also be a help. Not all cases of retroversion needed operation. He knew one case where a postoperative neurasthenia made the woman worse than before. She now thought she had a double uterus giving double symptoms. Operative treatment was not always successful. Recurrence followed the Baldy-Webster operation as recommended by Dr. Neill as well as the other operations. His own preference was for the Alexander-Mayo operation. Operations on the uterosacral ligaments at times also gave excellent results.

DR. MOULDEN thought that constipation with the large sigmoid getting in front of the uterus pushed it backward, and curing the retroversion followed curing the constipation.

DR. MARTEL preferred the Alexander-Mayo because of the part of the round ligament used. In the dispensary work at Columbia Hospital he found the cases in which the Alexander-Mayo operation had been done retained their position well and seemed to be more satisfactory than those upon which other operations had been done.

DR. ROWEN thought operative treatment of less and less value

*For original article, see page 118.

the more cases he saw. All of his retroverted adherent even incarcerated uteri had replaced themselves during pregnancy. He had one case of a woman with a retroverted uterus that was apparently immovably fixed in position who had gone through three normal pregnancies and still had her adherent uterus. During the past year he had had eight cases of Baldy-Webster operations all of which had remained so far in excellent position.

DR. SULLIVAN reported seven cases that after retroversion operations he had watched go through labor. Four of the cases had had a ventral suspension and all had inertia at the end of the first stage of labor, three of them had had forceps applied four hours after full dilatation, the fourth case delivered herself after twenty-four hours. Two more cases had had Alexander's operation and had gone through normal pregnancy and labor. One other case had had a Baldy-Webster operation. She had been twenty-four hours in labor but had progressed smoothly. He had also seen two cases of intestinal obstruction following intraabdominal shortening of the round ligaments. One after a Baldy-Webster that died and the other after a Gilliam that recovered after the operation for intestinal obstruction. The intestine had been adherent to the peritoneum under the right rectus incision.

DR. LAWSON referred to a case in which a decidedly retroverted and fixed uterus gave no trouble during a subsequent pregnancy. He thought that possibly some of the very early cases of relapse after a Baldy-Webster operation as frequently mentioned, were due to insecure suturing of the round ligaments to the uterus. He had operated upon several patients by this method and found the uterus in good position after succeeding pregnancies.

DR. WILSON thought the postpartum dorsal posture was responsible for many retroversions. He gets his patients up on the third day and into the knee-chest posture in the early weeks.

DR. PRENTISS would have the women up early but only when the uterus was contracted and hard.

DR. STONE would have the cause of the retroversion studied before the treatment was decided on. No ligament operation is curative in all cases. The uterosacral ligament was a fold of peritoneum which would support the uterus for a while but would not stand the strain of pregnancy. In some cases the ventral suspension or fixation was possibly necessary. The Webster-Baldy was quick, easy and gave a sure temporary result and the Alexander at times embarrassing to the operator and tedious, but in the suitable cases the Alexander or some modification of it seemed still to give the most satisfactory permanent results.

DR. MILLER thought that the retroverted pregnant uterus should be put in position if it did not right itself by two and a half months. Many did right themselves but in others the retroversion caused labor pains or miscarriages. He did not understand how Dr. Bowen's case could have such an adherent uterus and still have gone through three normal pregnancies. He found the pessary very useful, especially inserted some six weeks after labor,

and its use continued for three or four weeks the uterus would almost always return to a normal position. As to the operations for retroversion, Dr. Howard Kelly had had hundreds of cases of ventral suspension which had been very successful in maintaining the position of the uterus; the mortality of the operation was very small and the operation very quickly done. The suspensory ligament did lengthen with pregnancy and might cause obstruction. But he did not think that accidents occurred any more than after other operations. He thought the cases reported by Dr. Sullivan were unusual cases and would probably have had inertia independent of the ventral suspension. In the cases of infection and hemorrhage into the wound ventral fixation was apt to occur and there the results were different.

DR. STONE endorsed the early getting up after labor. He had recently confined three sisters and gotten them all up in bed on the second day with excellent results. One of the three had a retroversion and she was early put into the knee-chest position but the uterus would not stay in position.

DR. LOWE thought that getting out of bed early tended to avoid thrombosis and embolism.

DR. SPRIG thought the early getting out of bed at times was a mistake as the heavy uterus compressed the pelvic veins and interfered with involution. He found the pessary after labor a great satisfaction. He thought the abdominal binder tended to force the uterus backward and increase the cases of retroversion.

DR. CORLEY thought that each physician had a method of his own which he modified to carry out his own plans and that many of them worked out well.

DR. NEILL in closing said that he did not think the uterosacral ligaments of great supporting value. He found the internal ligament operations all attended with more or less chance of adhesions. In the Baldy-Webster method the strong part of the ligament was not cut off but used to support the uterus. He did not think the inertia in Dr. Sullivan's cases due to the suspension. He agreed that the binder did harm. The great difficulty in coming to a conclusion as to the efficacy of any operation was that the operators did not report the bad results after the operations.

Meeting of April 11, 1913.

DR. ACKER in the Chair.

DR. DANIEL WEBSTER PRENTISS reported

A CASE OF CROUPOUS PNEUMONIA IN A CHILD WITHOUT PHYSICAL SYMPTOMS UNTIL THE CRISIS.

S. S. P., white, seven years of age. A child of delicate constitution. About February 1, 1913, he had a mild attack of grip, in which a bronchitis was the principal symptom. Both ears discharged a blood-stained serum, and then healed promptly. The bronchitis improved, but had not disappeared when the pneumonia set in.

Present Illness.—February 19, he played on the sidewalk in the morning and came in to luncheon feeling very well, ate with a good appetite and resumed his play outdoors. At 3 P. M., he went into the house complaining of malaise, cold hands and chilliness. His temperature was 104, and he was restless. At 5 P. M. he had continuous pain and tenderness in the epigastrium, with exacerbations of sharp pain, temperature 106. He was restless all night, and the fever was not reduced more than one degree by sponge baths.

February 20, 10 A. M. Dr. Grasty saw him with me temperature 105. He was restless, nervous and slightly deaf. While we were examining his chest, he had a convulsion of moderate severity lasting about two minutes. Physical examination was unsatisfactory, but we were inclined to think the breathing in the right lower lobe was more distinct than on the left side. Cough was not a prominent symptom, and the respiration-pulse ratio was normal. In the afternoon he was listless, the temperature had not fallen, and he had a leukocyte count of 50,000.

From this time until the crisis occurred on February 25, there was little change. Continuous tenderness in the epigastrium was present, with attacks of sharp pain coming on every few minutes and seldom longer than half hour apart. Earache in the left ear, from acute middle-ear catarrh was often present and very severe. The mastoid was never tender.

The differential leukocyte count by Dr. J. B. Nichols was as follows: Small lymphocytes, 4.6 per cent.; large mononuclears, large lymphocytes, 3.4 per cent.; transitional, polymorphonuclears, 92 per cent.; no malarial parasites seen. The pulse varied from 110 to 140, and the respirations from 24 to 30 per minute. There was never cyanosis, dyspnea, or other symptom pointing to involvement of the lung.

Repeated examinations of the chest were made by Dr. Grasty and me, and at no time could we find any lung symptoms. Dr. G. N. Acker, Dr. I. S. Stone, and Dr. W. K. Butler also examined the boy and failed to find any pathological change in the lungs. All the physical symptoms pointed to some gastric disturbance.

On February 24, the temperature dropped to 100, and on February 25 to 97.6. On this day he had pain in the right chest with some dyspnea, and then moist râles appeared in the right subscapular region. The abdominal pain faded rapidly away.

From this time on his convalescence was continuous.

The points of interest in this case are:

1. Pneumonia was suspected from the high leukocytosis with abdominal pain.
2. Absence of physical signs of pneumonia until the crisis.
3. Normal respiration-pulse ratio throughout.

DISCUSSION.

DR. ACKER spoke of this condition as one of the most difficult for diagnosis from the absence of physical signs and the perfectly tranquil breathing.

DR. ABBE suggested that in such cases if suspicion of lung involvement was entertained an x-ray examination could do no harm and probably would clear up the question of lung involvement.

DR. LOWE called attention to the similar condition in old men and quoted a case where a man with a temperature of 100 and respirations of 40 had a mild dementia, called senile dementia by a consultant. In two days the patient's temperature fell to normal, dulness appeared in the chest, and two days later the dementia was gone.

DR. WALL emphasized the importance of the case in showing the absence of respiratory distress in such cases. He considered pain in the epigastrium significant.

DR. Stone was called to see this case on the diagnosis of peritonitis, and cautioned against the common desire of surgeons to make a diagnosis by exploratory laparotomy. In peritonitis he had never seen a temperature of 106 even in a child. Dr. Sprigg had made a diagnosis in this case from the history.

DR. SPRIGG had made a diagnosis without seeing the case from having just had a parallel case in a child of six years with epigastric pain, vomiting for five days, temperature 104 to 105.5, leukocyte count of 47,000. Pneumonia had been suspected. The condition had ended with a crisis at which time symptoms appeared.

DR. ACKER said that all those who had seen Dr. Prentiss case had considered pneumonia but the absence of rapid respiration had been most disconcerting.

DR. PRENTISS said that the history of grip and the persistent bronchitis aided in making the diagnosis of pneumonia. The rigidity and tenderness had also been suggestive.

DR. DONNALLY read the essay of the evening

ON THE EARLY DIAGNOSIS OF MENTAL DEFICIENCY.*

DISCUSSION.

DR. WALL in opening the discussion spoke of the care that must be taken in the diagnosis, and how all backward children should be considered as possibly in this class. It was usually a great shock to the mother to be told that her child was mentally deficient. Many cases were greatly aided in development by the Montisori methods.

DR. ACKER spoke of the difficulty in many cases in persuading the parents that a child would not develop normally. The onset of the mental condition was not noticed by the parents. He spoke of one case of forceps delivery in which artificial respiration had been necessary for an hour to start breathing. The infant had not been able to nurse at all at first and had convulsions at each nursing for the first three days. In spite of anticipated mental deficiency so far the child had developed normally though later deficiencies were almost sure to appear. As to treatment he referred to a case of idiocy up to the age of five years when a special nurse had taken the child in charge and taught him to take care of his bowels and bladder

* For original article, see page 185.

and the common necessities of life although he remained mentally totally deficient.

DR. WALL considered that asphyxia at birth almost invariably interfered with later mental development.

DR. FREMONT SMITH noted one case of microcephalus who was a superior to many normals in playing bridge whist.

DR. MORAN did not believe in birth injury as the probable cause of mental deficiency. Most of the idiots were born normally. The family resemblance of all Mongolian idiots was characteristic. He thought Jacobi's position wrong and the relation between artificial respiration and idiocy to be interpreted as a condition where artificial respiration was necessary to bring around the infant that was mentally deficient, and had inefficient respiratory nerves.

DR. STONE did not recall any instance of obstetric injury causing mental deficiency although he had seen some severe obstetric head injuries. Dr. Wall called attention to a case of Mongolian idiocy associated with exstrophy of the bladder showing at least an associated physical maldevelopment.

DR. SPRIGG called attention to the fact that the child that did not develop physically need not be also mentally deficient. He cited the instance of a child of four and a half years who had never been to school but had taught himself to read and read as well as many boys of fifteen. Another child of five years that was physically underdeveloped had mathematical ability to answer questions that could not be answered by his parents.

DR. DONNALLY called attention to the uneven development of the centers in the brain, Blind Tom was a musical genius yet mentally deficient and music was commonly developed in deficient. Mathematical prodigies were usually mental defectives and later State dependants. Mongolian idiots were apt to occur in even the select best families from the medical point of view.

REVIEWS.

CUNNINGHAM'S TEXT-BOOK OF ANATOMY. Edited by ARTHUR ROBINSON, M. D., F. R. C. S. ED., Professor of Anatomy at the University of Edinburgh. Fourth edition; enlarged and rewritten. Large octavo, pp. 1595 and xxv, Illustrated by eleven hundred and twenty-four figures from original drawings, six hundred and thirty-seven of which are printed in colors, and two plates. New York: William Wood and Company, 1913. Price, cloth \$6.50; half morocco \$7.50.

In a careful review of this admirable work we find everywhere evidence of most thorough revision. Every section has been fully revised and some completely rewritten. As the work now stands it is an epitome of anatomical knowledge, full in detail, accurate, and in every way up to date, so that it easily holds its well earned place as the required text-book in a majority of the American Schools of Medicine.

The authors of its various sections are all well known anatomists, being professors of anatomy at the Universities at Melbourne, Dublin, Cardiff, Durham, Liverpool, Edinburgh, Manchester, Oxford, and London. The present editor, Dr. Authur Robinson, is Mr. Cunningham's successor to the Chair of Anatomy at the University of Edinburgh.

The illustrations, particularly those in color, which add so much to the teaching value, are very fine and are used in greater number than in any other work on anatomy. A glossary of the International Anatomical Terminology (*Basle Nomenclature Anatomica*) is given, as this system is uniformly used throughout the work except in those cases where the results of recent researches have shown that the terms of the nomenclature are incorrect, or where the terms themselves do not conform with the principles of the terminology.

Of the various sections, those originally written by Professor Cunningham were the Central Nervous System, the Respiratory System, and the Ductless Glands. The account of the Central Nervous System has been revised and largely rewritten by Professor Elliot Smith of Manchester and is most admirable. The Respiratory System has been revised and largely rewritten by Professor Berry of Melbourne, and the section dealing with the Ductless Glands has been rewritten by Professor A. Campbell Geddes of Dublin. The description of the Alimentary System has been revised and partly rewritten by Professor Waterston of King's College, London. On account of the many changes necessary the section on General Embryology has been completely rewritten by Professor Robinson, who has also partially rewritten the account of the Vascular System.

The type and printing are very clear; the paper thin, tough, and without excessive gloss, and the binding so excellent that the book will lie open at any page. Altogether it is a work of which both authors and publishers may well be proud.

SURGERY OF THE UPPER ABDOMEN. In two volumes. By JOHN B. DEEVER, M. D., Sc. D., LL. D., Professor of the Practice of Surgery in the University of Pennsylvania, Surgeon-in-chief to the German Hospital, and Surgeon to the University Hospital, and ASTLEY PASTON COOPER ASHURST, A. B., M. D., Instructor in Surgery in the University of Pennsylvania and Associate Surgeon to the Episcopal Hospital, Philadelphia. Volume II, pp. 499, 52 illustrations, octavo. Philadelphia: P. Blakiston's Son & Company, 1914. Price \$5.00, net.

This volume, which completes the author's work on the Surgery of the Upper Abdomen, discusses the surgery of the gall-bladder, liver, pancreas, and spleen.

That an interval of more than four years has elapsed since the publication of the first volume is to be explained by the great mass of literature, not only recent, but also in a sense classical, which it is necessary for any one to peruse who wishes to be thoroughly informed on the surgery of the gall-bladder, liver, pancreas, and spleen. It has been the endeavor of the authors to supplement in this way

their personal experience, that they be better enabled to furnish information and opinions which may represent the crystallization of the views at present held in these important departments of surgery.

The contents are divided into twelve chapters, including surgical diseases of the biliary tract; surgery of the gall-bladder and bile ducts; surgery of the liver; tumors of the liver, gall-bladder and bile-ducts; injuries of the liver and biliary passages; surgery of the pancreas; tumors of the pancreas; surgery of the spleen; technique of operations.

The work bears the stamp of authority given by the large personal experience of the senior author and the industry of the junior in sifting the literature. It is clearly written, of good teaching quality, and will be read with benefit by all surgeons interested in the surgery of the upper abdomen.

MEDICAL RESEARCH AND EDUCATION. Edited by J. McKEEN CATTELL. Octavo of 536 pages. The Science Press. New York and Garrison: 1913.

This is the second of a series of volumes for the promotion of scientific research and educational progress issued by the Science Press and contains reprints of a number of addresses by Richard M. Pierce, of the University of Pennsylvania; William H. Welch, W. H. Howell, Franklin P. Mall, Lewellys F. Barker, of the Johns Hopkins University; Charles S. Minot, W. B. Cannon, W. T. Councilman, Theobald Smith; of Harvard University; G. N. Stewart, of Western Reserve University; C. M. Jackson, E. P. Lyon, of the University of Minnesota; James B. Herrick, of Rush Medical College; John M. Dodson, of the University of Chicago; C. R. Bardeen, of the University of Wisconsin; W. Ophüls, of Stanford University; S. J. Meltzer, of the Rockefeller Institute; James Ewing, of Cornell; W. W. Keen, of Jefferson; Henry H. Donaldson, of the Wistar Institute of Anatomy; the late C. A. Herter, of Columbia; the late Henry P. Bowdich, of Harvard.

We commend the book to those interested in medical education and research for it contains much well worthy of serious thought and much that is uplifting and helpful.

AMERICAN RED CROSS TEXT-BOOK ON ELEMENTARY HYGIENE AND HOME CARE OF THE SICK. By JANE A. DELANO, R. N. Chairwoman of the National Committee Red Cross Nursing Service, and ISABEL McISSAC, R. I. Member of the National Committee Red Cross Nursing Service. Prepared for and endorsed by the American Red Cross. Octavo of 25c pages. P. Blakiston Son & Company. Philadelphia: 1913. Price \$1.00.

This is a well-written little book. It is plain, simple, straightforward and thorough. It is so practical and helpful that it could be read to advantage by every woman and can be recommended without reserve.

DISEASE AND ITS CAUSES. By W. T. COUNCILMAN, A. M., M. D., LL.D. Professor of Pathology at Harvard University. 12mo. 250 pages. Henry Holt & Company. New York: 1913. Price \$c.50 net.

This book is written for the layman and not for the physician. In it Dr. Councilman discusses in a very broad and comprehensive way some of the general conditions underlying what we call disease, that is life under conditions which differ from the usual.

Its style and general interest will perhaps be best shown by a fairly long quotation from one of its chapters:

"Certain conditions have arisen in the past fifty years which have profoundly affected the thoughts, the beliefs and the activities of man. Within this period what is generally known as Darwinism, including under this evolution, has developed. Unlike theories which came from philosophical speculation only, the theory of evolution was one which could be subjected to observation and experiment. It freed man's mind from dogmas, it stimulated the imagination, it enlarged the territory in which it seemed possible to extend knowledge by the methods of science, and has resulted in an enormous increase of knowledge. This has been more striking in medical science than elsewhere, and in this of more far-reaching influence. Evolution coincided with another important development. History shows that all great periods of civilization have at their back sources of energy. In the civilizations of the past such sources of energy have come from the enslavement of conquered peoples or from commerce or more direct forms of robbery, which have enabled a favored class to appropriate for its purposes the result of the work of others. While these sources have not been absent in the development of our civilization the great source of energy has come from the rapid, and usually wasteful and reckless, utilization of the stored energy of the earth. The almost incredible advance in medical and other forms of scientific knowledge and the utilization of this knowledge is largely due to the greater forces which we have become possessed of.

"Disease plays such a large part in the life of man and is so closely related to all of his activities that the changes in this period must have exerted an influence on disease. The mystery which formerly enveloped disease is gone; disease is recognized as due to conditions which for the most part are within the control of man, and like gravity and chemical attraction it follows the operation of definite laws. There has been developed within the period what is known as preventive medicine, which aims rather at prevention than cure, and the resources of prevention are capable of much greater extension.

"Have there been new conditions developed within the period, or an increase of existing conditions which can be regarded as disease factors and which counterbalance the results which have come from the knowledge of prevention and cure? There has been an increase of certain factors of immense importance in the extension of disease. These are:

"1. The increase in industrialism, involving as this does an increase in factory life. In many ways this is a factor in disease. (a) By favoring the extension of infection, particularly in such diseases as tuberculosis. (b) The life in-doors, and frequently with the combination of insufficient air and space, produces a condition of malnutrition and deficient general resistance. (c) The family life is interfered with by the mothers, whose primary duty is the care of home and children, working in factories, and the too frequent conversion of the house into a factory. (d) The influence of factory life is toward a loss of moral stamina rendering more easy of operation the conditions of alcoholism and general immorality. How great has been this increase in industrialism, fostered as it has been by conditions both natural and artificially created by unwise legislation, is shown in the figures from the last census. The number of factory operatives increased 40 per cent. between 1899 and 1909 and the total population of the country in the period between 1900 and 1910 increased 20 per cent. It is probable that the future will see an extension rather than a diminution of mass labor.

"2. The increase in urban life is as conspicuous as the increase in industrialism. In 1880, 29.5 per cent. of the population was urban and 70.5 per cent. was rural; in 1910, 46.3 per cent. was urban, and 53.7 was rural, the increase being most marked in cities of over 500,000 inhabitants. Of the total increase in population between 1900 and 1910, 0.7 per cent. was in the cities and 0.3 per cent. in the country. City life in itself is not necessarily unhealthy and there are many advantages associated with it. The conditions which have chiefly fostered it are the immigration of people who are accustomed to community life, the increase in factory life and the increase in the number of people of wealth who seek the advantages which the city gives them. The city has always been the favored playground for the social game. The unhealthy conditions of city life are due to the crowding, the more uncertain means of livelihood, the greater influence of vice and alcoholism. Prostitution and the sexual diseases are almost the prerogative of the cities.

"3. All means of transportation have increased and communication between peoples has become more extended and more rapid. In the past isolation was one of the safeguards of the people against disease. With the increase and greater rapidity of communication there is a tendency not only to loss of individuality in nations, as expressed in dress, customs, traditions, and beliefs, but many diseases are no longer so strictly local as formerly—pellagra, for example. Only those diseases which are transmitted by insects which have a strictly local habitat remain endemic, although the region of endemic prevalence may become greatly extended, as is seen in the distribution of sleeping sickness. Diseases of plants and animals have become greatly disseminated. Any plants desirable for economic use or for beauty of foliage and flower become generally distributed, their parasites are removed from the regions where harmonious parasitic interrelations have been established, and in new regions the parasites may not find the former restrictions to their growth.

There have been many examples of this, such as ravages of the brown-tail and gypsy moths, which were introduced into New England, and of the San Jose scale which was introduced into California. There have been many other examples of the almost incredible power of multiplication of an animal or plant when taken into a new environment, removed from conditions which held it in check, as the introduction of the mongoose into Jamaica, the rabbit into Australia, the thistle into New South Wales and the water plant chara into England.

"It is very difficult to say, but it seems as though there is an increasing unevenness in the distribution of wealth, and increase of the number of persons who live at the expense of the laboring class. Mass labor, effective though it be, makes it easier to divert the proceeds of labor from the laborers. The evidence of this is seen in the increase in number and the prosperity of those pursuits which purvey to luxury, as the automobile industry and the florists' trade and the greatly increased scope and activity of the social game. On the other hand, there is an increase in the number of people who are to a greater or less extent dependent upon extraneous aid, evinced among other ways by the increase in the asylum populations. Both these conditions, wealth and poverty, are important disease factors. Tuberculosis is now a disease of the proletariat chiefly. The measures both of prevention and cure can be and are carried out by the well-to-do, but the disease must remain where there are the conditions of the slums. Of all the conditions favoring infant mortality poverty comes first. In Erfurt, a small city of Germany, of one thousand infants born in each of the different classes, there died of the illegitimate children 352; of those of the laboring class, 305; of those in the medium station (official class largely), 173; of those in higher station, 89. The same relation of infant mortality to poverty becomes apparent when estimated in other ways. In Berlin, with an average infant mortality of 196 per 1000, the deaths in the best districts of the city were 52 and in the poorer quarters 420. The effect of poverty is seen particularly in the bottle-fed infants; with natural nursing the child of poverty has almost as good a chance as the child of wealth. From reasons which are almost self-evident, the mortality in illegitimate infants is almost double that of the legitimate. The greater infant mortality in poverty is due to the more numerous children preventing individual care, the separation of the mother from the nursing child in consequence of the demand made upon her earning capacity, and the decline in breast nursing. Wealth is on the whole more advantageous from the narrow point of view of disease than is poverty, but if we regard its influence upon the race its advantages are not so evident. Nothing can be worse for a race than that it should die out, and wealthy families have never reproduced themselves. Conditions always tending to destruction are a necessary part of the environment of poverty: wealth voluntarily creates these conditions, and chiefly by the pernicious influence of its amusements on the young.

"A new and in many respects a nobler conception of medicine has been developed. Formerly medical practice was almost ex-

clusively a personal service to the sick individual, and measures looking toward the general relief of disease and its prevention received scanty consideration. The idea of a wider service to the city, to the state, to the nation, to humanity rather than the personal service to the individual, is becoming dominant in medicine. This is seen in the establishment of laboratories by boards of health in cities and states in which knowledge obtained by exact investigations can be made of direct service to the people; in the medical inspection of schools and factories; in promulgating laws against conditions which affect health, in the extension of hospitals, and in divers other ways. The idea of public service and of returning to the people in an effective way some of the results of their labor also underlies the large donations which have been given for the creation of special laboratories and institutes in which, through research, greater knowledge of disease may be obtained and made available."

BRIEF OF CURRENT LITERATURE.

OBSTETRICS.

The Dangers of the Momburg Procedure.—Mayer (*Gynäkologische Rundschau*, vol. vii, No. 11, 1913) reiterates the dangers attached to this procedure which he summarizes as follows: As the thin-walled vena cava is more thoroughly compressed than the aorta, the venous return flow is decidedly impeded, whereas the arterial stream is not affected, resulting in a stagnation below the point of compression and a sort of self-bleeding into the veins. He was able to demonstrate this fact in a recent autopsy following death after placenta previa. A second point refers to the necessity of cutting off the blood supply in the spermatic arteries in order to obtain a complete hemostasis in the uterus. In order to accomplish this, the compression must directly include these vessels or involve that portion of the aorta above their origin and in the region of the renal arteries. If the latter are compressed, and this is especially likely in a nephropathy, how are the kidneys affected? The latter point Mayer investigated in animals and found an actual diminution in the urinary secretion as the result of this circulatory interference. Moreover, degenerative processes resulted, marked by coagulation, necrosis of the epithelium of the urinary tubules, together with an albuminuria. It is probable that the same effect of such compression is to be found in the human subject. Functional kidney disturbances were also found by the author in a recently delivered woman as shown by a transitory albuminuria, so that particularly if renal lesions are present, this form of compression could not be employed. Damage to the heart is also likely after release from the compression.

Physiology of the Hypophysis.—Schlimpert (*Monatsschr. f. Geb. u. Gyn.*, July, 1913) presents results of a series of animal experi-

ments in which he used the fresh and dried hypophyseal glands of cattle and rabbits, both from adult animals and embryos. He found that the hypophysis of pregnant cattle, particularly the posterior lobes, did not show any greater hypophysin content than that obtained from nonpregnant animals. The hypophysin was found exclusively in the posterior lobes and not in the remaining segments of the brain; even those portions which resembled in their development the posterior lobe of the hypophysis. Hypophysin could be demonstrated in cattle embryos as early as the tenth week and in human feti in the sixth month, by its vasoconstrictor effect. When obtained from cattle embryos after the twenty-eighth week, an additional effect on respiration could also be elicited.

Cystic Tumors of the Uterus of Congenital Origin.—Vautrin (*Ann. de gyn. et d'obst.*, July, 1913), apropos of two cases of single cyst of the wall of the uterus, discusses the origin of congenital cysts. Some of the uterine cysts arise from the Wolffian body, others from the canals of Müller which unite to form the female genital organs. When we find a cyst lined with pavement epithelium and cylindrical epithelium we may feel sure that we are dealing with one derived from the Müllerian bodies. If derived from the Wolffian bodies, they will be lined with ciliated epithelium. The anomalies in fusion of the two canals of Müller are many and not uncommon. They produce very diverse formations. Rarely the cysts are lined with cylindrical epithelium alone, with or without glands analogous to those of the endometrium. In others the epithelium is pavement with or without glands analogous to the cervicovaginal glands. Again they unite the characteristic of cervix and body and both cylindrical and pavement epithelium are present, at different parts of the lining. These varieties depend on the portion of the canals that failed to unite. Only the cysts in which cylindrical epithelium alone is found can be confused with cysts developed from the Wolffian bodies. This vestigial inclusion of Müllerian tissue is subject to influences due to different manifestations of the genital life, menstruation, pregnancy, etc., which stimulate its growth. These tumors are independent of inflammatory action in the uterus, evolve in silence, and only with their increasing size become important and are discovered. They are situated in the substance of the muscular wall of the uterus.

Ovarian Changes Following Adrenalin Injections.—Varaldo (*Zentralbl. f. Gynäk.*, 1913, No. 37) refers to the functional association between the ovary and suprarenal bodies which is practically demonstrated by the results of castration as indicated by Fehling and the administration of adrenalin, according to Bossi on the course of an osteomalacia. Veraldo has attempted to explain some of these phenomena by citing the changes in the various animals which had been subjected to continuous subcutaneous injections of adrenalin. He found that during pregnancy in the rabbit, the resistance to adrenalin intoxication became increased, whereas castration diminished the same. Continuous injections of adrenalin produces in rabbits, well-marked macroscopic diminution in the size of the ovary.

Poisoning with adrenalin produced in the ovary microscopical changes as the result of degenerative processes, whereby the specific glandular elements were replaced by connective tissue. These results seem to show that a certain antagonism is present between the function of the cortical substances of the suprarenal glands and the ovaries.

Pregnancy in Cases of Acromegaly.—Kalledy (*Zentralbl. f. Gyn.*, July 12, 1913) reports the case of a woman thirty-two years of age who had developed well-marked symptoms of acromegaly after her twenty-second year with complete amenorrhea, extreme adiposity, irregular gait, changes in the long bones, etc. As a hyperfunction of the hypophysis is assumed to be the cause of this disease and as an antagonistic effect between the ovaries and hypophysis is believed to exist, the author was lead to treat his case with ovarian extract. The preparation employed contained 1 gram of fresh cow's ovary to the cubic centimeter. For a time he administered three intravenous injections per week and within a few months menstruation appeared, although tablets of the dried extract had to be substituted for the injection, because it was inconvenient to administer the latter. Four months after beginning treatment, menstruation ceased and as a diagnosis of pregnancy was subsequently made, the medication was stopped. At the time of the report the pregnancy had progressed to the fifth month. The author believes that the ovarian extract in this case simply paralyzed the excessive amount of hypophyseal hormones. A further report of this case will be of interest.

Spina Bifida and Puerperality.—R. Gilles (*Rev. mens. de gyn. d'obst. et de ped.*, July, 1913) says that for the most part the subjects of spina bifida die before attaining adult life and so never become pregnant. The author has seen one adult case and has collected others. The author's case was operated upon for a myelocystocele. She was born with a lumbar spina bifida. She had no trouble until she was eleven years of age when there was a retraction of the extensor tendon of the right great toe necessitating a tenotomy. At twelve years she had a right equinovarus, for which operation was undergone. At twenty the left foot was affected by osteitis of the first metatarsal bone which necessitated extirpation. Two months later operation was done for the spina bifida. The tumor was removed and the hiatus closed with catgut. Soon after, sloughing began on the right plantar surface. Five years later appeared talipes equinovarus of the left foot complicated by ulcers. Ten years later this foot had to be amputated. Soon after this she became pregnant. Early in pregnancy the sphincters became paretic, and eschars on the legs increased. Later she was taken with gastric crises and vomiting. She became emaciated and cachectic. She could hardly drag herself about by aid of orthopedic apparatus and canes. There was a marked resistance of the muscles of the abdomen to palpation. Contractions at labor were severe and very painful but did not cause dilatation. Delivery was accomplished by forceps. Pregnancy aggravates the morbid mani-

festation allied with this congenital deformity. The sphincter paralysis becomes much worse. The eschars increase and become much worse during pregnancy. The delivery is impeded by a contracture of the abdominal muscles. Dilatation is slow but expulsion quick, due to the paresis of the pelvic muscles. There is a true atony of the perineal structures.

Death in Chorea Complicating Pregnancy.—G. Lepage (*Ann. de gyn. et d'obst.* Aug., 1913) gives the history of a case of very severe chorea complicating pregnancy, which ended in death from exhaustion after the delivery of the child. In the majority of cases chorea is not a fatal complication of pregnancy. The principal symptoms which may indicate the probability of a fatal issue are very great intensity of the choreic movements, which prevent nourishment and sleep, and are not lessened by sedatives; mental symptoms which may precede or accompany the chorea; acceleration of pulse and rise of temperature; appearance of measles-like eruption. Death may come suddenly, before abortion or labor has taken place. Late interruption of gestation does not have very good results, still it should be tried when other measures fail. Interruption causes a temporary lessening of movements and a return of sleep, but soon the trouble returns with increased intensity. In most cases autopsy has not shown important lesions; in some cases there are found old or recent vegetations on the valves of the heart. It is not at present possible to say what effect the intoxication of pregnancy has on chorea, or the reasons which make chorea especially severe during pregnancy.

Use of Pituitary Extract in Obstetrics.—F.C. Harrison's (*Arch. Int. Med.*, 1913, xii, 322) attention was attracted to the advantages of pituitary extract in obstetrics from the results seen in animal experimentation in the pharmacological laboratory. These show that the uterine movements have been very markedly increased in both rate and amplitude, while the tone has not been raised, save at first where an irregular tetanus may be seen. In none of the cases in which it was employed was a true tetanus uteri, *i.e.*, a very marked rise in tone with comparatively slight superimposed movements, seen. Pituitary is of great value in cases of weakness in uterine movements after the soft parts are well dilated. Failure in these cases is rare, probably less than 1 per cent. The later in labor, but before delivery, the more striking the effect. The danger to the child and mother is very slight. As an addition to some mechanical method, *e.g.*, the Champetier de Ribes' bag, it is of great value in bringing on premature labor or abortion. In the former case it may be sufficient in itself, but there is some risk of tetanus of the cervix, or of the uterus, especially when repeated injections are required. For delivery of the placenta its use is accompanied by the danger of tetanus uteri and retention. In postpartum hemorrhage a considerable percentage of failures may be expected. When a need for a uterine stimulant arises in cases conforming to the above indications, the writer believes that pituitary extract is of the greatest value.

GYNECOLOGY AND ABDOMINAL SURGERY.

The Injection of Human Blood in the Treatment of Anemia.—Weber (*Münch. med. Wochenschr.*, June 17, 1913) refers to the method already suggested by himself a number of years ago, which includes the administration of small amounts of human blood by transfusion. In one case a severe reaction resulted and doubtless an inflammatory or a thrombotic process was present. A later method used by the author is as follows: From a healthy youthful individual 20 to 30 c.c. of blood are removed by puncture from a vein in the arm and this allowed to flow into a dry sterile flask. Defibrination is secured by agitation for five minutes with a glass rod, after which the blood is filtered through sterile gauze into a second flask which is then placed in the ice-box for twenty-four hours. Previous to the injection the blood is brought to the body temperature and 5 c.c. of the fluid after shaking, is slowly introduced into the cubital vein. Forty-six transfusions were given to eighteen patients and in only six instances was a slight reaction noted. The writer believes that the process of defibrination reduces the toxic character of the blood to a large extent but not entirely. A combination of this treatment with arsenic is of value although in some of the cases treated with the blood alone, very good results were obtained.

Bactericidal Action of Mesothorium.—Bondy (*Zentralbl. f. Gyn.*, Aug. 2, 1913) calls attention to the observations which have been made in connection with the employment of mesothorium in sloughing of uterine carcinoma, in connection with the question whether this is due to the removal of soil favorable to their growth or to a distinct bacteriological action of the preparation. A determination of this question would prove of value in the application of the remedy for other bacterial diseases of the female genitals. Tests made by the author with various pyogenic organisms in culture exposed to mesothorium, showed that the growth of the same was distinctly inhibited by the preparation. It was found, however, that the effect of the emanation did not extend to any great depth and that exposures extending over a certain length of time would be necessary. Moreover only those rays which are subjected to slight filtration could be expected to manifest any decided bacteriological action. In this instance the danger of tissue destruction would be merely increased. The author believes therefore that the favorable effect of mesothorium in sloughing carcinomatous tumors must be contributed to the direct effect on the tissues rather than to any bactericidal power.

Significance of Premature Rupture of the Membranes.—Basset (*Ztschr. f. Geburtsh. u. Gynäk.*, Bd. lxxiii, Hf. 2) discusses the effects of premature rupture of the membranes on labor and the puerperium, basing his conclusions on a series of 4141 labors in Küstner's Clinic at Breslau. From a study of the cases in which a rupture of the membranes occurred before the cervix was completely dilated or dilatable, no abbreviation of the length of labor could be determined. Youthful primiparæ and old multiparæ seem particularly pre-

disposed to early rupture of the membranes. In pathological labors including contracted pelves, a premature rupture of the membranes is common. Prolapse of the cord in transverse presentations and abnormal positions of the vertex are frequent after early rupture. Lacerations of the cervix seem to occur in but few instances but operative interference is frequently necessary. Atony of the uterus is apparently infrequent. Fever during the puerperium occurs very often, more so in multiparæ than in primiparæ. Mortality among the mothers is low but that of the children in these series was 1.6 per cent. In view of the possibility of complications arising it is not advisable to rupture the membranes before full dilatation has been reached. The membranes are only to be ruptured in those cases where in the presence of complications that may suddenly appear, operative delivery is readily possible.

Irradiation of the Ovaries.—Antoine Lacassagne (*Ann. de gyn. et d'obst.*, Aug., 1913) details his experiments in irradiation of the ovaries in rabbits. The use of the rays soon produced marked atrophy of the ovaries; but after the rays were stopped the ovarian cells that had not been destroyed developed and functionated. Therefore in the rabbit there is no certainty of destruction of the ovaries by the rays. In a dog that was rayed it was found that the amount of rays needed to cause atrophy of the ovary caused at the same time destruction of the follicles of Lieberkuhn and ulceration and perforation of the intestines, resulting in death. In the larger animals the difficulties of irradiation increase. The distance from the surface of the body, and the inexactitude of the knowledge of the position of the ovary make it difficult to place the apparatus so as to get just the right amount of action from the rays to cause sterilization and not death. Few cases of ovaries treated thus in women have been published. It can hardly be regarded as positively established that the good effects of the rays on fibroids are due to sterilization and atrophy of the ovaries, therefore the author concludes that in using the rays for tumors we should direct the rays on the tumor itself instead of on the ovaries. It is illusory and dangerous to attempt the sterilization of the woman; still by sittings with low-powered rays, regularly repeated, atresia of the larger follicles may be obtained and their development lessened. We must study these problems in the human being much more carefully before we can arrive at definite conclusions.

Glycogen Content of Mucous Membrane of Fallopian Tube.—In carrying out an investigation, V. J. McAllister (*Jour. Obst. and Gyn. Brit. Emp.*, 1913, xxiv, 91) aimed to discover whether the mucous membrane of the tube ever contained glycogen, and whether, in the case of a positive finding regarding the presence of glycogen, the glycogen content was subject to a cyclic variation in relation to menstruation, as is the case with the endometrium. The first question he answers definitely in the affirmative, as in seven of the tubes examined glycogen was present in considerable amount in the cells of the mucous membrane. Pregnancy is not essential to the presence of the glycogen. Undoubtedly the glycogen content

of the mucous membrane of the tube undergoes considerable variations, and at a time when the endometrium presents all the signs of secretory activity and the epithelial cells of its glands are loaded with glycogen, the mucous membrane of the tube can be glycogen-free, and, *vice versa*, when the endometrium is free from the glycogen, the tubal mucous membrane may contain it in considerable amount. The extremely small glycogen content of the tubal decidual cells in the writer's preparations is interesting as contrasting with the usually large content of intrauterine decidual cells. Inflammation seemed to exercise no effect in increasing the amount of glycogen present in the tubal epithelial cells. Only once was glycogen found in the cells of the corpus luteum and even then the amount was very small.

Infantile Type of Uterus with Dysmenorrhea.—T. J. Watkins (*Surg., Gyn. and Obst.*, 1913, xvii, 461) says that dysmenorrhea is most often due to imperfect development of the uterus. The pain is chiefly caused by contractions of the uterus, which soften and dilate the cervix and are much like the pains of the first stage of labor. Prophylaxis is the most important part of the treatment. The general health of the girl should be carefully looked after during puberty. Dysmenorrhea is often due in part or entirely to the general condition of the patient. In cases of infantile uterus causing dysmenorrhea the logical treatment consists in the use of remedies to promote development. The use of the intrauterine stem is useful in such cases. The patient should be kept under supervision for months after the use of the stem pessary. The cervix should be dilated when possible before each period for some months. The stem pessary should be reinserted after one or two months if necessary. This treatment is indicated only in the severe type of cases. It is, however, a poor substitute for marriage and pregnancy. In cases of excessive menstruation with clots and severe pain relief may be obtained from the use of suprarenal gland, which has lately been recommended. Suprarenal gland diminishes the action of the ovarian secretion. One 3-grain tablet of the desiccated gland is given three or four times daily, for three days just before or during the early part of the menstrual period.

Relationship between Gynecological and Neurological Cases.—W. P. Graves (*Bost. Med. and Surg. Jour.*, 1913, clxix, 557) summarizes his conclusions of the relationship between minor gynecological lesions and functional neuroses by saying that: pelvic conditions which cause constant irritating, nagging pain or discomfort eventually produce neurotic symptoms, which are greatly increased if there be added the element of pathological mental habit with consequent overvaluation of the local sensations. There is, however, no mysterious or specific connection between the genital organs and the central nervous system. There is on the other hand between the two, exactly the same relationship that exists between the brain and every other area of the body, and the laws of pathological action and reaction are exactly the same. The performance of gynecological operations cannot be expected to cure

true psychoses, but they may greatly improve the mental condition by removing the pelvic irritation of pain and discomfort, while in certain cases, which from the standpoint of the psychiatrist are essentially curable, operations may greatly facilitate or hasten a complete cure.

Postoperative Intestinal Stasis and the Intraabdominal Use of Oil.—W. F. Burrows (*Med. Rec.*, Nov. 1, 1913) has carried out a series of animal experiments showing the harmlessness and value of neutral mineral oil, used intraabdominally. In most simple abdominal operation its use is not required since prophylactic care will limit postoperative distress, but in all others the oil is of the greatest value when employed upon abdominal pads during operation or sponged gently upon intestinal coils previous to closure of the incision, excluding only areas where adhesions are desired and having care that all plastic procedures and intestinal anastomoses are completed before oil is introduced. In cases presenting extensive adhesions or widespread peritonitis, large amounts of oil (up to 6 or 8 ounces) are required. The writer's conclusions, based upon the peritoneal reaction to chemical irritation and upon the results of using neutral oil intraabdominally to control infection and effects of traumatism, both mechanical and chemical, as observed in guinea pigs and dogs, are as follows: Iodine, mercuric chloride solution, carbolic acid, alcohol, etc., applied to the peritoneum, rapidly spread beyond the area intended, through capillary action and affinity for the tissues, destroy the endothelial cells, cause an excessive exudate and tend to produce permanent adhesions. Olive oil, containing fatty acids, and commercial liquid petrolatum, the impurities in which are acids, rosins, fats and oils, both animal and vegetable, combining irritating substances with a bland oil, produce inflammation of intact peritoneal surfaces, as is shown by the occurrence of a watery hemorrhagic exudate, which differs, however, from that which takes place in the absence of oil, in that agglutination and organization do not follow. Bland, nonirritating oil, represented by a purified liquid petrolatum obtained from Russian oil, causes none of the changes occurring in the process of adhesion formation, which are endothelial cell injury, coagulable exudate, agglutination, organization, and finally connective tissue and fibrous scar formation. The oil has no appreciable chemical action upon the tissues nor deleterious effect upon the animal and is slowly absorbed. Oil, used intraabdominally in sufficient quantity, prevents, to a great extent, the formation or recurrence of adhesions. Oil fills the lymphatic channels leading from spaces denuded of peritoneum or opened by incision, thus limiting septic absorption, and, through preserving the endothelial cells, prevents extension of destructive processes. Oil is used to advantage, intraabdominally, in place of salt solution, upon abdominal pads, and to protect and lubricate the abdominal contents, thereby eliminating or minimizing postoperative intestinal stasis, vomiting, and abdominal pain.

DEPARTMENT OF PEDIATRICS.

ORIGINAL COMMUNICATION.

DIAGNOSIS OF MENTAL DEFICIENCY IN INFANCY AND EARLY CHILDHOOD.*

BY

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THE mentally deficient child has come to occupy in our day a very important place in the minds of the laity as well as of the medical profession, because of his unproportionate increase as compared to the general increase of population, making him both absolutely and relatively more frequent; and because of his potential danger to his fellowman, the nation, and society. The numbers of criminals, murderers, incendiaries, prostitutes, anarchists, and other perverts and social burdens are being increasingly augmented from this recruiting source. Such bodies as the National Committee for Mental Hygiene with its state societies, are systematically endeavoring to combat this growing evil by the study of its causes, the most effective means of their restriction, and the dissemination of principles of mental hygiene. As physicians we have the responsibility of the recognition of the defective child at as early a time in its life as possible, when most can be done to prevent the dangers of the defective to the community, and when early training especially adapted to this social burden may be instituted, so that a positive harm may be rendered less harmful, and some useful thing wrought into its unreceptive, unretentive, incomplete and one-sided mind.

No fact which physicians can communicate carries greater woe to parents than the information that their child is an idiot or mentally impaired to some slighter degree. Yet we have to do so now more often than ever before.

"In cases of very marked mental deficiency the disordered condition of mind can be discovered in the first months of life. In fact

*Read before the Washington Obstetrical and Gynecological Society, April 11, 1913.

if parents and physicians had a proper understanding of such conditions, the mental defect could be discovered very much earlier than it generally is" (B. Sachs).

In order to do this there is the necessity, *first*, of well-defined concepts of what the normal infant is, both physically and mentally, for defective mental development is closely allied in infancy to disturbances or delay of appropriate physical growth and nutrition. Llewellys Barker says, "One fact which has become ever clearer as medical knowledge has advanced concerns the nutrition of the child. Faulty feeding in infancy and early childhood may lead to such impoverishment of the tissues and such stunting of the growth that the ill effects can never be recovered from in later life. A considerable proportion of the intellectual and moral inferiorities among our people is fairly attributable to imperfect nutrition at an early age." On the other hand incomplete development or degeneration of brain prevents in its turn proper physical development. These relations are reciprocal and interdependent. We must nevertheless have standards with which to measure a given infant to ascertain its variance if any from the norm of the average healthy child both physically and mentally. The accompanying chart gives without elaborate detail a working guide for evaluation of an infant's relation to the normal development. These measurements may be multiplied to any degree of elaboration desired. Thus the classic work of Preyer furnishes in exhaustive detail the psychic development of his own child from birth to the end of its third year, records having been made in his diary at least three times a day of the child protected as much as possible from the usual training. He says that he found almost daily a psychogenetic fact to record. One or two other physicians have done a similar service.

A few extracts from Preyer's observations will show what may be expected of a normal child at different stages of its development:

During first month: Recognizes difference between light and dark objects (even on first day); follows with its eyes objects moved slowly before it (as early as eleventh day); begins to hear about the fourth day; recognizes sounds toward end of first month; learns to distinguish between bitter and sweet; recognizes disagreeable odors; first tears on twenty-third day during a crying spell; expresses displeasure by turning head away, by shutting its eyes, and, of course by crying; begins to smile.

During second month: Recognizes human voices and direction from which sound comes; turns head toward low sounds; is quieted by song; smiles when music is heard; recognizes its mother.

During third month: Moves arms, expressive of pleasure; listens attentively; is able to support head a little; uses definite sounds in crying.

During fourth month: Associated eye movements perfect; stares at new objects; recognizes strange surroundings; reaches after distant objects; first attempt to sit upright.

During fifth month: Recognizes strangers as such; likes to take hold of everything; stretches out its arms to be taken up; holds head straight; sits alone; moves legs as if to walk; forms syllables.

During sixth month: Distinguishes faces; stares at strangers; smiles, if smiled at; smiles with relatives, not with strangers; turns its head toward a person leaving the room; begins to creep; "crows."

During the seventh month: Follows objects dropping out of its hands; recognizes its image in mirror with evident pleasure; points with finger at pictures; purposive movements; associates persons and names; extends hands when asked; articulates a number of different sounds in crying and in "lolling to itself."

During eighth month: Sits upright when carried; some children attempt to stand and to walk.

During ninth month: Begins to imitate tunes; laughs heartily; begins to beg for things.

During tenth month: Takes an interest in its food; recognizes parent after absence of several days; he begins to walk alone; answers questions by motions and indicates where certain things are.

During eleventh month: Stands quite alone; pushes chairs; makes first attempt to repeat sounds impressed upon its mind; begins to articulate its own name; understands language fairly well.

During twelfth month: Imitates laughter of others; stretches its arms out to enforce its demands; improvement in walking and standing; looks at others attentively while they eat.

During fourteenth, fifteenth and sixteenth months: Independent speech is acquired, and repeats spoken words easily; in seventeenth month may speak short sentences, using verbs; from this time on there is steady improvement in memory of words and use of language.

At two years: may learn to repeat rhymes, to detect colors, etc.

In the child of defective mental development or who is idiotic, we may say in general that practically all of these signs both physical and mental of normal development are delayed months or years in their appearance. The development of early life may take place moderately well and the child later on show signs of mental defect. This latter is only exceptionally so, for one usually finds upon close enquiry and examination, deficiency early manifesting itself by

delayed appearance of these physical and mental characters just recounted. Just here reference may be made to the value of the baby book which some mothers now keep, in which a record is made of the time of appearance of the various facts in the child's development and growth, such as recognition of its mother, its bottle, objects in its environment, holding up its head, sitting alone, respective eruption of the first teeth, crawling, holding playthings, pulling up to its feet, pushing chairs, walking alone, first words, etc., etc. This, as physicians, we should encourage, for although not the records of medically trained observers, they yet possess a distinct value to the medical attendant in case of illness requiring his services.

The examination of a given case should, of course, proceed in the usual complete and systematic way that all careful clinical work is done at the present day, but it may be permissible to emphasize certain features of the history taking and physical examination which help in making the picture of mental deficiency stand out and aid in its diagnosis. In the first place one must bear in mind the inordinate influence of heredity in this class of disorders, it being a factor in well over 50 per cent. of the cases. There have been worked out for us several of these families of defectives, such as the Jukes family in New York; the Tribe of Ishmaelites in Indiana, and last year Dr. Goddard published his carefully studied history of the Kallikak family—the family of Deborah Kallikak a high-grade imbecile in the Feeble-minded School at Vineland, N. J. A summary of this now well-known story is perhaps pardonable because of the concrete proof it offers of the inexorable effect of heredity and the validity of Mendel's laws. Martin Kallikak a youth of a good colonial family, at the age of twenty, became the father of an illegitimate child by a feeble-minded girl of unknown name and heredity, and this begins the illegitimate line of his descendants traced through five generations by Dr. Goddard. After the Revolutionary War he married a woman of good colonial stock and from this union, there were six children who constitute the first of the legitimate descendants of Martin Kallikak to the number of 496 who have all been normal people, respectable members of the community, enjoying prominence and prosperity. There were 480 descendants of the one illegitimate child of whom only forty-six have been normal mentally. One hundred and forty-three have been definitely feeble-minded and the rest possibly so. Among 480, thirty-six have been illegitimate; thirty-three have been sexually immoral; twenty-four have been confirmed alcoholics; eighty-two have died in infancy; three were criminal; eight kept houses

of ill fame. They have occasionally married normal persons, but usually into families of about the same type, so that they have increased their degeneracy and have been a burden to the community, often living helpless and in squalor and filth, the prey of anyone who cared to use them for any base purpose, a hopeless, helpless, economically impossible group.

So then in taking the history one must inquire carefully into the ancestry of the child, noting the physical and mental condition of parents, grandparents and other relatives, their diseases and habits, particularly insanity, syphilis, epilepsy, hysteria, and alcoholism. Home environment next often gives a valuable clue to diagnosis.

In the previous history of the child the length and character of the labor, the use of instruments or not, asphyxiation or not, whether it took the breast well or not and whether it had spasms or convulsions in its early life, may give information pointing to cerebral injury at the time of birth or meningeal hemorrhage with its destructive brain effects and resultant mental deficiency.

The detailed story of its state of nutrition at birth and subsequently has the importance already referred to in quoting Dr. Barker; and the time of occurrence of the everyday facts of its development, which mothers can give, as sitting erect, playing, walking, talking, dentition, etc., tell whether the child's development was delayed and how much it was delayed, and this constitutes most valuable data from which to conclude as to its mental state.

The occurrence of convulsions at any time of the ordinary infectious diseases of childhood, whooping-cough, measles, scarlet fever, and particularly of meningitis, and poliomyelencephalitis, is noteworthy.

In the physical examination of the child stripped of its clothing simple inspection deserves more than passing comment. Sachs says, "I am willing to say that in fully one-half of the nervous diseases of children the nature of the trouble can be suspected, if not made out, by a thorough inspection of the child without putting a finger to its body." When possible this is most effective in a well-lighted, warm room with the child part of the time lying on a padded table at a suitable height for the rest of the examination. Peculiarities of facial expression, gait, stature, shape and size of the head, presence of any of the stigmata of degeneration, state of nutrition, spastic and flaccid paralyses, and other states of the muscles, give on inspection first impressions to be followed up by exact measurements for comparison with the normal average given in the accompanying

chart and by detailed physical examination from its superior fontanel to its toes. The mental condition as revealed to the examiner at the time of the examination is noted. The eyes must receive special attention. In regard to the special senses, that of taste is best formed at the time of birth, next smell, sight and hearing. Whether the infant sees and hears must be determined. The electrical reactions give important information, as in peripheral nerve degeneration, and again in increased electrical excitability.

Some of the more common stigmata of degeneration are asymmetry of the skull; of the face; deformities of the palate; irregularities of the teeth, tongue, lips and nose. Of those about the eye may be mentioned chromatic asymmetry of the iris; narrow palpebral fissure; strabismus; nystagmus; and blindness. Anomalies of the ears and deafmutism occur; polydactyly and syndactyly; enuresis; very much diminished resistance to external influences and to disease, particularly tuberculosis and pneumonia.

In idiotic children voluntary movements may not be noted before the end of the first year. Supporting of head, standing, and attempts at walking are all delayed. These children seldom begin to walk before two and one-half to three years. Dentition is very much delayed; it is latest in cretinism. As a rule, idiots are undersized and underweight. An idiotic child will not follow a light, and but few of them recognize their parents and objects at one year. The majority of them seldom acquire speech before three and one-half to four years while one in five fails to acquire speech at all. At three years normal children will play and build with blocks and know the names and uses of common objects. At four to five years they know letters and are able to count. At six they can read, spell and write simple words of one syllable. Idiots cannot accomplish this before they are advanced in years and some never can. Sight is generally good; some are born deaf and others have varying degrees of deafness; taste and smell may be deficient. The cranium is the most common seat of abnormalities. In fully half it is from $1\frac{1}{2}$ to 4 inches less in circumference than in normal children of the same age; microcephaly, hydrocephaly and other types of head deformity may be seen. Beside inability to talk in some, others have aphonia, stammering, stuttering, scanning, and noise production. Ten per cent. are said to suffer with some form of paralysis, and peculiarities of gait and locomotion are common. All movement is in excess; they cannot stand nor sit still but are possessed of a continual movement and restlessness and most busily pull to pieces and destroy whatever they can put their hands on, frequently

putting things in their mouths and chewing or pulling them to pieces. Various bodily movements are seen.

Slightly over half of the mental defectives do not conform to any one of the several types seen among the others. In this large atypical group are found all grades of severity of the affection, and the high-grade imbecile presents difficulties in diagnosis of the highest degree. Furthermore, one has to distinguish from the high-grade imbecile in whom the prognosis is bad because he will never get beyond a certain point in his education, the child who is simply retarded and mentally backward and who eventually may become educated into a normal human being. The imbecile is much more likely to show some of the stigmata of degeneration, be undersize and weight, have a skull below normal measurements and show either torpor or abnormal movements and restlessness. By careful scrutiny of the history one may often find the cause of mental backwardness in some condition in the life of the child, such as defective nutrition, prolonged illness, defect in hearing or vision, refractive errors, adenoids or what not. Such a child usually has no stigmata of degeneration and head measurements are normal. The final test of course is eventual outgrowth from the backwardness, and this occurs with sufficient frequency in apparently severe deficiency to make physicians very guarded in giving a prognosis before time has had an opportunity to correct the tardiness. The mentally deficient being degenerates succumb early to disease oftentimes and mortality among them is about ten times as great as among normal or simply backward children, and varies with the type and degree of defect from a few months to thirty years or more.

For determining the mental age of a defective child educators and physicians for some years past have been using the Binet-Simon tests. These tests are founded on what normal children can do mentally for the ages respectively from three to sixteen years, and are of great value in the classification of defectives. They are extensively used and highly spoken of by those of the greatest experience with them. The purposes of my paper do not comprehend the classification of the older defectives but relate rather to the early diagnosis before these tests become applicable. In fact five years and older is probably as young as the Binet tests may be used.

Classification of mental defectives is quite unsatisfactory and want in agreement exists. Morse teaches his students a simple classification into two broad heads, first those cases with evident cerebral defects or changes as in infantile cerebral palsies, hydrocephalus and microcephalus, and those cases without evident

cerebral defects or changes including the Mongolian, the amaurotic family idiot of Sachs and the unclassified or plain idiots. The classification presented here is one given by Reuben and seems to be useful in gaining an insight into the subject.

1612 I St., N. W., WASHINGTON, D. C.

TRANSACTIONS OF THE NEW YORK ACADEMY OF MEDICINE.

SECTION ON PEDIATRICS.

Meeting of November 13, 1913.

DR. HENRY D. CHAPIN, *in the Chair.*

THE BACTERIOLOGY, DIAGNOSIS, AND TREATMENT OF INTESTINAL AFFECTIONS IN CHILDHOOD.

DR. RALPH VINCENT, of London, England, read this paper by invitation. (See Report of the New England Pediatric Society, held in Boston, November 8, 1913.)

DISCUSSION.

DR. WILLIAM H. PARK.—If on the beautiful photographs shown and the excellent clinical results obtained the bacteriological findings seem to me to be of less value, I feel that Dr. Vincent will appreciate the expression of a difference of opinion. I judge Dr. Vincent, as a busy and successful physician, has not done as much work in bacteriology as in medicine. There are two points upon which I especially wish to speak. First, a point distinctly made but that was somewhat in the background in the paper, the deleterious effect of heating milk, I wish to consider. The New York Department of Health has been endeavoring to have all milk pasteurized that is produced under such circumstances that it cannot be certified as clean and safe. If Dr. Vincent's fears were true we would have to change this. His bacteriological findings are quite different from those I have obtained. If one takes a sample of milk from a healthy cow in a cleanly way one gets no bacteria or very few, except those that may be in the udder or the milk channels. Streptococci when present in small numbers appear to be harmless, but they are not desirable and they should be absent if the udder is normal. Just today we examined ten samples of milk from certified farms and could find no bacteria in searching smears

in eight of these samples; in the other two we found small numbers of streptococci in one sample, and a considerable number in the other. Some time ago we examined the milk of fifty cows consecutively and in most of them no streptococci could be found; when streptococci were present in large numbers the cows were eliminated from the herd. Most of those well informed on these matters prefer to have no streptococci in the milk, and I cannot believe that they add anything of value to the milk, while when many are present we fear that they may be infectious streptococci. Dr. Vincent stated that when milk was incubated for twenty-four hours the streptococci formed chains in raw milk; and appeared as diplococci in pasteurized milk. I tested this last week with ten samples; in eight out of the ten instances they grew at all stages of development as diplococci and not as chain. When the lactic acid bacilli or streptococci develop in milk sufficiently to inhibit other bacteria it is beyond that stage at which it is a fit food for any infant. Until this stage of acidity is reached all types of bacteria increase. So it is not until we get beyond a point where milk should be taken at all that the harmless bacteria supplant the more deleterious types.

In undertaking the examination of fecal matter, Dr. Vincent has attacked one of the most difficult problems in connection with bacteriological work in the intestinal diseases of infancy. These examinations I believe are likely to be very confusing. The method of adding feces to milk and incubating is apt to give too confused a picture to be of any definite value. To the bacteriologist the identifying of the mixed fecal bacteria by stain and form could hardly be taken seriously. The colon and dysentery bacilli would stain and look alike. It is possible, but to me it seems improbable, that Dr. Vincent has been able to obtain real help from these examinations.

The attempt to correlate the clinical and bacteriological conditions certainly deserves praise.

DR. HENRY KOPLIK.—Dr. Vincent deserves our thanks for raising this discussion and presenting this painstaking and beautiful review of the work done on the bacteria in milk. Pasteur, Gafky, and Escherich have shown that milk cannot be perfectly sterilized or pasteurized, and that in pasteurized and sterilized milk there remains the sporulated bacteria and the potato bacillus, the so-called *bacillus mesentericus vulgatus*, all of which in time cause the sweet and bitter fermentation of sterilized milk. Recently in Paris I came across a perfectly sterilized milk sold for infant feeding which in storage had turned bitter. But this is hardly an argument against the use of pasteurized or sterilized milk. We aim by pasteurization and sterilization to destroy the harmful bacteria, streptococci, *bacillus lactis*, and typhoid bacilli in the milk which would be immediately harmful to the infant. Pasteurized or sterilized milk for infant feeding is intended to be used within twenty-four hours and not kept for days until it may ferment as above mentioned. I consider the pasteurization of milk for consumption by infants as one of the greatest blessings given by science to the infant.

If we go back to the time of Pasteur and Escherich the rôle of bacteria was everything; to-day we have another school, that of Czerny and Finkelstein, which holds that the bacteria are not necessarily the cause of abnormal intestinal conditions, but that the food elements, the fat proteids and carbohydrates, have as much to do with the infection of the baby as do the bacteria. We are not yet decided as to the rôle that bacteria play in the intestinal diseases of childhood. We know, however, that there are certain bacteria that make the child mortally ill; certain streptococci will have this effect such as the typhoid bacilli, the streptococcus enteritis and the dysentery bacillus. Whether we can differentiate these forms outside the laboratory at the bedside I cannot say; we all have tried it and felt ourselves confused. The problem has been worked out in the examination of the sputum in tuberculosis and if Dr. Vincent can work out the problem as it affects intestinal diseases in children he will give us a powerful weapon, but we are not convinced that he has as yet arrived at a sure method of making a differentiation of the organisms concerned in producing pathological conditions in the alimentary tract in infants, thereon founding indications for the feeding and management of these patients.

DR. CHARLES G. KERLEY.—I wish briefly to refer to a few points not touched upon by Dr. Park or Dr. Koplik. First, as to the necessity we feel for help in the treatment of the intestinal diseases of infancy. There is not a man here who has practised for fifteen or twenty years who can treat his intestinal cases very much better to-day than he could fifteen or twenty years ago. I saw some of Dr. Vincent's work in his hospital this summer. He has been working very conscientiously for a number of years and his work is deserving consideration. In order to square the results that he claims with those in this country, however, we will have to take into consideration the difference in the countries, climates, etc. In the class of cases with which he deals it is the intestinal contents that are involved in most instances and not the intestinal structure as it is in this country; the latter is rarely affected in his cases. In this country our autopsies show gross lesions of the inner structure of the intestines, sometimes extending through to the peritoneum. In the matter of mortality, if we take up Dr. Vincent's method of work we would not get the good results that he gets. In London they do not know what hot weather and humidity such as we have here, means. When we undertake to square the results obtained in England or on the Continent with our own, we must remember that we are dealing with different kinds of children living under entirely different conditions. Summer heat and humidity that we experience in this country are unknown in England.

We must take these things into consideration and not question the results of our colleagues in those countries, and they, on the other hand, must not think us unusually stupid if we do not succeed in getting the results that they have obtained.

Children fed on cooked milk thrive and develop normally. I can supply fifty children who have been fed on cooked milk and

fifty others who have been nourished on raw milk and no one could tell judging from their physical condition as to which one had been fed on cooked food.

DR. L. E. LA FETRA.—Dr. Kerley and I had the privilege of seeing Dr. Vincent's work last summer at the Infants' Hospital in London. It was very interesting to see the laboratory and the wards in closest communication. If any simple and practised method could be devised for bacterial study that would give us help in regard to the line of treatment we should take advantage of it. I am not familiar with the technical bacteriological side of the work sufficiently to pass judgment upon it, but the clinical results could be explained it seemed to me by Dr. Vincent's careful observation and clinical experience as well as by his laboratory work. The dietetic part of his treatment was more important than the administration of bacterial cultures. In England the severer types of intestinal disease are seldom encountered.

Dr. Kerley does not really think that we cannot treat these cases better now than we did fifteen years ago. There are so many methods of treatment now and so many forms of milk and of sugars that we did not have access to a few years ago that we are certainly in a better position to treat these conditions. We should be grateful to anyone who brings aid in diagnosis or suggestions as to the treatment of the intestinal diseases of infancy.

DR. WILLIAM P. NORTHRUP.—I did not intend to discuss the paper, but I would like to express my appreciation of Dr. Vincent's effort to find an accurate method of diagnosis and to apply appropriate treatment to these cases. We should all appreciate the fruits of his labors.

DR. RALPH VINCENT; London, Eng.—I assure you that I have used the method described myself and have found it of so much assistance that I would not attempt to treat these conditions without it. I am not at all disturbed by the bacteriologist calling my methods rough and ready. The methods are those that seem best calculated to meet the indications. It is absolutely necessary to find the bacillus actively at work and it is possible to find these organisms without any doubt. I perfectly agree that when the milk is perfectly fresh there are no streptococci in chains; in four hours they are not very common, but in eight hours they are invariably present. Dr. Park leaps from the time of milking to a time twenty-four hours later and states that all are diplococci. At the end of eight hours he would find the streptococci in chains. I hope he will make examinations at four, eight, and twelve hours and he will find this true. The Royal Society has confirmed this bacteriological work. I went to a farm, picked out the healthiest cows and had the milk examined and found streptococci growing luxuriantly. At Johns Hopkins they have found this to be a fact and condemn the milk, and if they do this they will have to condemn every milk. One does not find the chains when the milk is first drawn. I believe the natural diet of the child is raw milk.

When Dr. Koplik says that it is a question of food, this is true;

of course if you eliminate the lactose of cow's milk the lactic acid bacilli will not grow. Again it has been stated that about 50 per cent. of the cases here have blood in the dejecta; that is quite unusual with us. Gross lesions of the intestines are very rare. It is the products of digestion in the canal and not the canal itself that we are concerned with in most cases. Sometimes we have a few severe cases and I am prepared to learn. It would be interesting to have observations made here and in England and to compare results. In reply to the question raised by Dr. LaFetra as to the benefit of the cultures, I would say that in many of the series of cases we have cultures and after three weeks the relapse would occur; we would then give cultures again and the condition would be controlled. The natural diet alone was not sufficient in all cases, but cultures of streptococcus lacticus were required in many instances.

BRIEF OF CURRENT LITERATURE.

DISEASES OF CHILDREN.

Dohle's Leukocyte Inclusions.—Alex. Brinckmann (*Berl. klin. Woch.*, July 7, 1913) believes that leukocyte inclusions have hardly been shown to be pathognomonic of scarlet fever, though they occur more constantly in this than in other infectious diseases. They are present in all acute febrile cases of scarlet fever, and in small numbers also in all abortive or slight cases. As a result of his researches the author thinks that these inclusions may be found in all cases that are examined in the early stage of the disease, whether severe or slight, and even in atypical cases. Therefore the positive finding has diagnostic weight, but a negative finding does not exclude the disease. An acute febrile disease not showing inclusions is probably not scarlet fever. These inclusions are of pathological interest, since they are newly observed, and biologically their nature is not known. They are probably not foreign bodies but products of the cell itself. They are found in almost all the leukocytes and at the periphery as well as in the center; they do not stain as do the nuclei and are basophilic. Their number bears a definite relation to the height of the temperature curve only at the beginning of the sickness. Their presence in other acute infectious diseases is too inconstant for them to be considered as simply indications of infection.

Prognosis and Treatment of Meningitis.—V. Reichmann (*Münch. med. Woch.*, July 24, 1913) says that not in all cases in which micro-organisms are found in the cerebrospinal fluid are there symptoms of meningitis. In a lately observed case in which there were hemolytic staphylococci, it was shown by culture that these germs were absent from the fluid. Only headache was complained of, no other meningitic symptoms being present. Lumbar puncture showed no increased pressure. There was a slight increase of leukocytes, an opalescence of the fluid, and a few staphylococci. Bacteria may be absent from the fluid when pressure is increased, phagocytosis of high de-

gree, and albumin increased. Such a form is of good prognosis, but is little known. Such a meningitis is called aseptic or sterile. It is differentiated from the serous form by the presence of pus in the liquid. The etiology of these cases is unknown or they come from extension from a neighboring purulent process in the brain. The first form of unknown etiology is very similar to cerebrospinal meningitis in its symptoms, and may be considered as an abortive case of that disease. In the second group, originating in connection with a near-by purulent process, there may be a sudden onset with severe brain symptoms, and great changes in the cerebrospinal fluid; still the prognosis is good. There are cases in which to a neighboring purulent process is added a bacterial infection, whose prognosis is good. All other bacterial meningitis cases have a bad prognosis. It is quite otherwise with tuberculous meningitis, in which the nerve tissue is filled with tubercle bacilli, and yet the liquid is clear or contains a few lymphocytes. Here the prognosis is always bad, yet some cases are cured. Lumbar puncture and the injection of normal salt solution have given little permanent results, although they cause temporary relief of symptoms. Normal salt solution is injected only when the fluid contains thick flocculi of purulent material. Lumbar puncture is an aid to diagnosis rather than a therapeutic measure of value. In all cases of unconsciousness lumbar puncture should be made with the hope of benefit. It should be done daily in early cases. A large amount of fluid should not be removed, since in case of an abscess the sudden relief of pressure may cause its rupture. We should reduce the pressure to about normal. Through lessening of pressure the venous congestion of the brain is lessened and consequently the edema. Good results have been obtained by some authors by subdural injection of leukocytes. The matter of feeding is important, since in the unconscious cases the child takes no food and dies as much from lack of nutrition as from the disease. The author gives milk by nasal or oral gavage, and this serves to keep up the nutrition until recovery begins.

Vaccine Therapy for Pertussis.—L. Lagane (*Presse méd.*, July 23, 1913) gives the results obtained by Nicolle and Concor in the treatment of 104 cases of pertussis by vaccine. Of these 37 per cent. were cured, and 36 per cent. improved, after from two to five injections had been given in from three to twelve days. Only those cases were cured that were inoculated within the first two weeks of the disease. These results are not as good as were hoped for, but are still encouraging. It should be noted that the injections have not been tried as a prophylactic measure as yet.

Pericardial Effusion, and Epigastric Puncture of Marfan.—Germain Blechmann (*Ann. de méd. et chir. inf.*, July, 1913) tells us that pericarditis with effusion is found in one out of two patients with pericarditis under fifteen years of age. The period of childhood includes half the cases. In children more than half are under five years, and it is not rare in infants. In the infant and young child the cause is generally bronchopneumonia or empyema. Between five and fifteen years articular rheumatism is responsible for most of

the cases. From ten years up pneumonia begins to be a factor. Between fifteen and thirty years rheumatism and pneumonia are equally frequent factors. After thirty rheumatism disappears and nephritis appears as a causative factor. The fluid collects principally above the diaphragm, or behind, at the right in the cardio-hepatic region, or to the left of the point of the heart, but not in front of the heart. Therefore puncture must be made below the heart; the subxiphoid is the most sure and simple procedure. Exploratory puncture is always indicated. Operation is indicated in infectious, acute, toxic, and mechanical pericarditis. In purulent cases pericardotomy with drainage is indicated; in hemorrhagic, aspiration. It evacuates the fluid, increases comfort of the patient, and assists in cure. When purulent exploratory puncture is of assistance in suggesting the need of drainage.

The Umbilical Lung.—E. Bonnaire and G. Durante (*Presse méd.*, July 5, 1913) call attention to the frequency of lung lesions in connection with infection of the umbilicus, even when this trouble is entirely latent. In such cases the prognosis is very bad by reason of the various visceral lesions that are present, which cause death, or of which traces are left behind in later life. The manifestations of infection at the umbilicus are protean; they vary from an acute febrile condition, to a very mild attack with few symptoms. If infection comes by the lymphatics it is slow, and reactions of defense take place; still the toxins act on the viscera. When the infection enters by the blood-vessels it is much more rapid. There may be superficial localization of the infection, deep localization, primary septicemia, secondary septicemia, and latent or chronic forms. In the liver there may be acute infectious hepatitis, an acute degeneration, chronic fatty degeneration, or a sclerosis, which explains some secondary cirrhoses. In the lung toxic lesions are shown by congestion, cultures made from the fluids remaining sterile; by miliary infarcts, miliary infarcts combined with zones of congestion, hemorrhages, and nodular hepatization. In these cases the bronchioles are intact, the microbic colonies being in the lumen of the small vessels, and none in the alveoli, which is the opposite of the condition found in bronchitis. The prognosis in severe cases is very bad. The worst cases of this infection are seen in the premature infant. The symptoms are slight in many cases, but physical examination will reveal the signs of consolidation where it exists.

Primary Acute Orchitis of Children.—L. Ombrédanne (*Presse méd.*, July 19, 1913) says that orchitis is rare in the child before puberty. Blenorrhagia is exceptional, variola and varicella are seldom accompanied by orchitis. There is sometimes fever; the scrotum is red and edematous; the testicle and epididymis cannot be separately felt, and the testicle is enlarged and hard. Repose is generally sufficient to cause the inflammation to recede. If it does not, an abscess may form, with necrosis, the testicle being eliminated entirely. The author has learned to call this orchitis of masturbators, since it is generally in these cases that it occurs. In the author's experience there is generally a torsion of the cord

causing the inflammation. He has found torsion in four out of seven cases operated upon by him. Three of them were confessed masturbators. Masturbation is a cause of acute congestion, and thus a factor in torsion of the cord. Operation should fix the testicle so that torsion is no longer possible.

Bone Surgery and Heliotherapy.—A. Aimes (*Prog. méd.*, July 12, 1913) finds that exposure to the sun is of great benefit in bone surgery, causing rapid and complete healing. In traumatisms it is of especial value, and in nonunion the effect is to cause formation of callus so that union soon takes place. In osteomyelitis and osseous grafts it assists greatly in the consolidation of the graft. In infectious osteitis the sun bath is an excellent postoperative treatment. By its bactericidal action it stops suppuration, and sterilizes the tissues. The active vasodilatation which it produces assists in the formation of granulations and hastens cure. The author details three cases treated by him. Its especial value is in unconsolidated fracture, complicated fractures, and repair of extensive osteomyelitis.

The Organic Theory of Chorea.—Delearde and Valette (*Arch. de méd. des enf.*, July, 1913) say that one of the most recent theories of the etiology of chorea is that it results from organic changes in the nervous system. The authors have studied twelve cases of chorea and have looked for signs that in other affections are supposed to be due to organic lesions of the nervous system. Jouffrey has put forward the theory of a maldevelopment of the nervous system, or rather a hypersensibility of that system, which remains latent up to the time when it is put in action by the occurrence of an infectious disease, such as rheumatism, grippe, an eruptive fever, etc. The organic theory regards the changes as only the results of an infection; such infection manifesting its presence by the production of organic changes, which constitute an efficient cause of the chorea. Thomas, basing his affirmations solely on clinical data and the frequent coexistence of psychical troubles, localizes the changes in the cerebral cortex. He adds that the lesions are slight, and reparable since Sydenham's chorea is easily cured. But we must remember that many autopsies have revealed no organic lesions. The signs of organic lesions that are to be looked for are numerous and complex. They are muscular hypotonia, changes in the reflexes, and combined flexion of the thigh and trunk. Their absence in hysterical hemiplegia, and presence in true cases where autopsy reveals organic changes goes to show that they result from these organic changes. Also there is a marked difference between the demeanor of a choreic and a hemiplegic under examination. The choreic is nervous, irritable, agitated, while the hemiplegic is calm and quiet. In chorea hypotonia is evidenced by exaggerated flexion of the forearm, hand, shoulder, and pronation of the hand. Combined flexion of the thigh and trunk is seen in about one-quarter of the cases. Lessened muscular force was seen in three cases. The reflexes were exaggerated in three, normal in seven, abolished in two of the twelve cases. What Thomas calls the pyramidal syndrome he found present in two-thirds of his cases. The authors performed lumbar

puncture in ten of their cases. In none of them was there any positive result from the examination of the fluid. There may be present in chorea various indications of mental troubles, such as irritability, modifications in character, and lack of memory or intelligence. The authors observed such phenomena in two cases. The authors conclude that the signs of lesions of the nervous system have not been observed in these cases with sufficient frequency to show an organic origin of chorea.

Use of Aromatic Arsenic Preparations by Rectum in Infants.—A. Weill, A. Morel, and G. Mouriquand (*Arch. de méd. des enf.*, July, 1913) state that although the venous injection of salvarsan is preferable in adults it is somewhat dangerous in infants, and the introduction of the drug by rectum is to be preferred. The veins are so small and a slight movement of the infant while the needle is in place may make so much difference in the absorption of the drug that it is best not to inject it. The authors have used the rectal method in late hereditary syphilis, severe chorea, and other diseases. In a case of hereditary syphilis there was limitation of the lesions in less than twelve days, and they began to retrocede. At the end of four weeks the perforation of the palate was healed, sight was better, and the parenchymatous keratitis was improving. Arsenobenzol seems to have a good effect in chorea, even of the severe form. Its action is rapid, but not enduring. The injection should be followed by arsenic internally. The authors conclude that this method is good in late heredosyphilis, and severe chorea, and that the passage of arsenic into the urine proves that it has been absorbed by rectum.

Cyclic Vomiting in Children.—H. T. Ashby (*Practitioner*, 1913, xci, 53) says that cyclic or periodic vomiting occurs only in children and consists of severe attacks of vomiting, coming on at intervals and appearing in a period of good health. The attacks come on without any warning, and stop almost as quickly as they begin. Children subject to these attacks nearly always come of a neurotic stock, and are easily excited and upset; it would appear as if a less amount of toxin would set up an attack than in normal children. The characteristics of the condition seem to be simply the continuous vomiting, which starts suddenly in a child, in whom nothing abnormal can be made out either in the abdomen or chest. In any child taken ill with acute vomiting, if the abdominal or chest condition can be eliminated, the likelihood of cyclic or recurrent vomiting must be thought of. The absence of much rise of temperature in a child so acutely ill, the presence of the very quick pulse, the sweetish smell in the breath, with acetone and diacetic acid in the urine, will all help to make us more certain of a definite diagnosis. The prognosis is generally good, although the children become very much run down and exhausted. The interval between the attacks may be as short as three or four weeks or as long as a year. The one fact that is evident is that acidosis is present. The opinion was formerly held that there was deficient oxidation, especially of fats; that, in consequence, there was an accumulation of oxy-futyric and diacetic acid in the tissues; and that the symptoms of the

disease were the result of these toxins, the vomiting being simply an effort to get rid of them. A more reasonable theory is that there is an intestinal toxemia, most likely due to the liver, and that the acidosis, as shown by the acetone and the diacetic acid, are simply the result, and not the cause, of the trouble. In support of this is the fact that the acetone and diacetic acid do not appear till the attack has well begun. It looks as though the carbohydrate metabolism were upset, as these cases improve very much when glucose is given in large quantities during an attack. On the theory that the liver is at fault, and that there is an absence or nonusage of the carbohydrates, we give sugar in large quantities during an attack and, if possible, before an attack comes on. The best way is to give it as glucose in soda water, giving an ounce of glucose every two hours by the mouth, if possible. The children get very thirsty during an attack, and a good deal is vomited, if a drink of the glucose and soda water is given soon after an attack of vomiting, some of it will be absorbed before the next attack of vomiting comes on. The glucose should also be given *per rectum* in large quantities. The bowels should, of course, be kept freely moving with enemata, and if the child during an attack is getting worn out a small injection of morphine may be given to diminish vomiting and secure rest.

Neuroses of Childhood.—C. W. Burr (*Arch. Pediat.*, 1913, xxx, 416) says that the fundamental qualities that differentiate the nervous child from normal children are a pathologic irritability shown by an excessive response to stimuli of all kinds, weakness in withstanding stress, and a lack of ability to develop power of inhibition, with often a lack of physical strength or, rather, a lack of will to make effort. As the cause of "the nervous child," heredity plays a much larger part than environment. Whatever the physical cause of "nervousness" may be, it is independent of the nutritional processes. The more important of the neuroses and psychoses present in childhood and babyhood are motor disturbances—convulsions, stammering, habit-spasm, generalized tic, chorea, epilepsy; purely mental disorders—insanity (mania), night terrors, day terrors, hysteria, obsessions; vasomotor disorders—morbid blushing, tachycardia; disorders of special viscera—nervous vomiting and anorexia, enuresis; headache. The exciting causes are very various but the underlying cause is in the child himself. The neuroses and psychoses vary greatly in their importance as portents. The child who suffers a series of them almost always is a life-long invalid, but many children suffer from one or another, regain equilibrium and retain it throughout life. Most children who suffer from enuresis, stammering, habit facial spasm, night horrors and the much rarer day horrors, save when the latter is really a manifestation of epilepsy, recover entirely and grow up into average men and women. Of all these the seriously affected stammerer suffers most, because he frequently never recovers and his speech defect cuts him off from so many things in life that he may become morbidly introspective as an indirect result of his stammering. Convulsions, apparently accidental in origin, may develop into epilepsy, but the mere occurrence of a

convulsion, or even a series, if the child recover without any sign of organic brain disease, is not of very great import as to future health. Mania is practically the only insanity occurring in childhood. Usually, if it does not kill, it ends in imbecility. The few who escape become, as a rule, permanently insane in early life. Children with genuine hysteria are easily cured of their attacks, but continue to be hysterics. Passing obsessions are more frequent in children than we are aware of and a large majority of the sufferers show no sign of mental disease in later life. The most important thing in the training of "the nervous child" is the teaching of emotional control, and that cannot be done by making life easy. The whole spirit of to-day is against teaching children self-control. The real fundamentals of education are self-control (inhibition), obedience, duty, and a love for work. The child too carefully guarded will, when he meets inevitable exposure to any stress, succumb. The child who has too much attention paid to its aches and pains may become a youthful hypochondriac. The child not taught in the nursery and the school to bear unwhimperingly this daily stress will break so soon as he gets into the world of life.

Dispensary Treatment of Chorea.—Most of these children, says A. Newlin (*Arch. Pediat.*, 1913, xxx, 441), have been on an improper diet. Tea, coffee and sweets play a prominent part in their menu, milk being a neglected food. A little care in the selection of their food and the time of meals, directions as to proper mastication, exclusion of tea, coffee, cakes, candies, etc., between meals, will not only remove from their dietary these injurious articles, but will increase the appetite, regulate the bowels and improve the general nutrition. The mistake of endeavoring to give the child fresh air by keeping her out-of-doors results in the elimination from her treatment of a factor which is more important than any other in the treatment of chorea, and that factor is rest, mental as well as physical. No other part of the treatment of chorea can compare to it and no drug can take its place. Pure air is a great advantage in any disease, but in the treatment of chorea it should not be obtained by out-door exercise, but by proper ventilation of the living and sleeping rooms of the patient. Even the milder cases should be put to bed at once for six days. At the end of that time she is allowed to be up for an hour in the afternoon and on the seventh day returns to the dispensary for re-examination. If there is decided improvement rest in bed until noon is required for the second week, followed by two to three hours' rest on a lounge or sofa during the third week, according to the progress of the case. If no improvement is noted at the end of the first seven days, the same routine is carried out during the second week and the hours for being up and dressed are arranged for as the case progresses. A careful search for the presence of any condition that might act as a nervous irritant should be made at the first examination. Of these, ocular defects, perhaps, are the most frequently found. Other peripheral irritations are, in the order of their importance, the presence of enlarged tonsils, or adenoids, or both, phimosis or preputial adhesions, carious

teeth, seat worms, etc. Two diseases that might easily be overlooked at this time, and which are most important in this connection, are tuberculosis and syphilis. Whatever drug is administered, it should not be to the exclusion of iron if the child be anemic or not.

Diphtheria of the Esophagus.—J. D. Rolleston (*British Journal of Children's Diseases*, September, 1913) calls attention to the fact that this condition is probably not so rare as is generally supposed, although there are details of only twenty-four cases on record. In the author's case, a boy of six years, death resulted on the fifth day and the autopsy showed a diphtheritic membranous deposit in the lower portion of the esophagus, in addition to that found in the palate, nasopharynx, larynx and trachea. The author examined two additional cases of diphtheria which died in the acute stage, in two of which an esophageal membrane was present. It is to be noted that although diphtheria of the esophagus and stomach is usually fatal, four cases of diphtheria of the intestines have been recorded, all of which recovered. In those cases of diphtheria of the esophagus which ended in recovery, a stricture resulted.

Separation of the Lower Femoral Epiphysis.—In a study of eighteen cases of separation of the lower femoral epiphysis, H. Binney and F. B. Lund (*Bost. Med. and Surg. Journ.*, 1913, clxix, 49) say that any case of injury to the knee in a patient below twenty (the age of ossification of the epiphysis) is suggestive of epiphyseal separation. Owing to danger of subsequent interference with growth, absolute reduction and fixation at the earliest possible moment is of great importance. Early and repeated x-rays are necessary to control the completeness and permanency of the reduction. In simple cases, where immobilization in flexion fails to hold the fragment in correct position from the start, open reduction with the use of a small nail or bone-plate is indicated. In compound separation the same means of positive fixation is to be recommended. The foreign body should be removed soon after union has begun in order to avoid interference with growth. This should be done not later than the third week.

Formula for the Determination of the Surface Area of Infants.—Certain physiological functions are directly dependent on the surface area of the body. For the determination of the surface area various formulas have been proposed. A formula is required that will have accuracy and elasticity so that it may be applicable to infants of all degrees of nutrition. Simplicity of calculation is also to be desired. To this end, J. Howland and R. T. Dana (*Amer. Jour. Dis. Child.*, 1913, vi, 33) have constructed a formula of the $y = mx + b$ form, using the data supplied by Meeh and Lissauer. They have employed the weight as the only variable in the formula, as it is apparent from a study of the figures given by Meeh and Lissauer that the length and the circumference of the chest bear no necessary relationship to the extent of surface. In this formula,

y = surface area of child in square centimeters;

x = weight of child in grams;

$$m=0.483;$$

$$b=730$$

Meeh was anxious to obtain a formula accurate for all ages of normal individuals; Lissauer, on the other hand, measured with one exception only poorly nourished and emaciated infants. Comparison of the results obtained by actual measurement and by the use of the formulæ of Meeh, Rubner and Heubner, Lissauer, and the present writers, it is seen that the gross error compares as follows: Meeh, 12.4 per cent.; Rubner and Heubner, 9 per cent.; Lissauer, 5.7 per cent.; $Y=mx+b$, 0 per cent. It also demonstrates that the formula $y=mx+b$ gives trustworthy results for all classes of children, the well and the poorly nourished, while the other formulas that have been proposed are not accurate in this respect. By the other formulas it is necessary to take the cube root of the square of the weight of the child, multiplying this by an arbitrary constant, in order to obtain the desired area. In contrast with this, a simple multiplication and one addition are all that is required. It is expected that with further observations, it will be necessary to alter the formula somewhat, but the method of constructing the formula will still be the same and at the present time the formula is the most exact of those that have been proposed.

Treatment of Diphtheria with Staphylococcus.—F. L. Wright (*Jour. A. M. A.*, 1913, lxi, 26) says that in the New York State Agricultural and Industrial School the boys are frequently carriers of the Klebs-Löffler bacillus. In spite of the following measures, each of which was given a conscientious trial, it was often a matter of months to obtain the two negative cultures necessary for release: spraying nasal passages and pharynx every three hours with normal saline, also gargling throat with this solution; swabbing tonsils and fauces with 10 per cent. silver nitrate solution daily; spraying nasal passages and pharynx and gargling, with one-fourth dilution of liquor antisepticus; gargling every four hours with brewer's yeast; gargling and spraying every three hours with lactic acid buttermilk. Since using a twenty-four-hour culture in plain bouillon of the *Staphylococcus pyogenes aureus* in such cases, spraying the nose and throat of each new inmate once and the nose and throat of all cases and carriers every three hours, the following results were obtained. With the old methods: average number of cases thirty-five; average time of isolation thirty-two days; average number of carriers twenty-two; average time of isolation thirty-four days. With the staphylococcus broth: average number of cases thirty-two; average time of isolation twenty-two days; average number of carriers 34; average time of isolation, eleven days. This method appears to be absolutely innocuous and capable of causing the early disappearance of the diphtheria bacillus.

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ORIGINAL COMMUNICATIONS.

THE RÖNTGEN RAYS, RADIUM AND MESOTHORIUM IN THE TREATMENT OF UTERINE FIBROIDS AND MALIGNANT TUMORS.*

BY

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I ACCEPTED with much pleasure your kind invitation to report here the results of our studies with radiotherapy in gynecology. However, I know very well that I can by no means speak conclusively. The whole matter is, I am convinced, still in its infancy, but despite this I believe that a discussion of the subject would be of the greatest advantage. My assistant, Dr. Gauss, and I, have come here with the object of furthering the cause by this discussion and also in order to learn from you. At the International Congress in London, the universal discussion aroused over this matter, has already advanced our knowledge and broadened our capabilities; and the great amount of experience which was then put forward from the American side especially in the paper of Abbè, with reference to the radiotherapy of benign and malignant tumors, has contributed very substantially to the elucidation of the problem.

It is natural from the nature of the subject that we should discuss the ray treatment of the benign and the malignant growths separately. As might be expected from the above, the two kinds of swellings respond in such a strikingly different manner, that it is quite impossible to discuss the two groups at the same time.

* Read by invitation at a meeting of the Section of Obstetrics and Gynecology of the New York Academy of Medicine, November 28, 1913.

The treatment of benign tumors of the female genital apparatus, if I may be permitted to speak of these first, we may consider as established in its essential points. Experience is plentiful enough to enable us to draw decisive conclusions; and further, the length of time of such observations is sufficiently long to enable us to speak of certain and lasting results. The domain, to which radiotherapy is particularly well adapted, is that of the fibromyoma, which can now be undertaken in the most widely varying manner. We have made use of Röntgen ray treatment exclusively in the greatest number of cases. Quite recently also we have adopted the treatment by mesothorium, as well as a combined method of treatment with Röntgen rays and mesothorium, and also Röntgen rays and radium. I was fortunate enough to be in a position to demonstrate our principles of Röntgen ray treatment to various colleagues on their visits to Freiburg. I should like to emphasize here that our technic differs from the technic of others, namely, that of the French and of Albers-Schönberg of Hamburg, in that we have directed our efforts toward the treatment of the patient with the largest possible doses. We lay particular emphasis on the fact that high dosage is by no means necessary in every case of this kind, and that, in a certain percentage of cases, one attains an equally good result with disproportionately small doses. That which has led us, however, to the use of large doses, is the fact that we could not in a single instance know in advance whether patients would not behave refractorily toward the small doses. For, obvious as it is, and confirmed by experience, that women over forty-five years of age are more easily influenced by Röntgen rays, and that the desired object, namely, amenorrhea with a diminution in size of the tumor, is more easily attained in these cases than in younger individuals, nevertheless we unfortunately still do find cases often enough among women over fifty, which cannot be treated successfully with small doses. If one has begun to treat the case with small doses, and then the case does not react to this small dosage, there is just that much valuable time lost. It is however not merely the time which comes into consideration, but from our observation, small doses have this disadvantage, that at first the hemorrhage becomes so much more intense, lasting over such a long period of time, so that in blood-poor patients, conditions of acute anemia may intervene, threatening the life of the sufferer. On the other hand, we have never observed any unpleasant incidents with the application of high dosage, so that the one disadvantage of the certainty which the application of the higher dosage gives in therapeutics is the cost. Since we changed over to the high doses,

and that was practically something over three years ago, we have, as I should like to say, found no case up to the present time which did not react to the treatment. That is to say, we have in every case attained the desired result, namely, the amenorrhea. The number of myomas, which we have treated with Röntgen rays, amounts at the present time to 350 cases.

As the after-results have been watched for several years we are entitled in these cases to speak of permanent cure. The chief aim of radiotherapy would ideally consist in (1) diminution of the size of the tumor, and (2) in diminution of the severe hemorrhages, but without an absolute amenorrhea. We have made many attempts to attain this end, especially in young individuals, but we must confess that we have very seldom gained the desired object. Generally the shrinkage of the tumor only begins when the amenorrhea is actually established, and moreover, relapses are frequent if menstruation has not completely ceased. X-ray treatment of myoma is comparable to total extirpation or supravaginal amputation of the myomatous uterus. Better than radiotherapy is myoma enucleation, because in spite of the removal of the myoma, menstruation still continues and also power of conception. If, above all, we look at the question from the social point of view of the women concerned, we may at the present time state very decidedly that radiotherapy of myomata is in every way far superior to the operative treatment of the myoma by means of total extirpation or supravaginal amputation of the myomatous uterus. Since it appears from our experience, and as has been shown in a great number of cases, that as a matter of fact, the myomas which do not react to radiotherapy amount to *nil*, then you will readily understand why we in the Freiburger Frauenklinik have abandoned the operative treatment for myoma in all cases in which the choice was at our disposal, except in the rare cases when myoma enucleation appears to us to be indicated. One great advantage of radiotherapy of the myoma over the operative measures I should like to point out, and that is, that radiotherapy does not endanger the life of the woman.

If I now admit, too, that in the hands of very dextrous operators the mortality, after total extirpation of the myomatous uterus, is relatively small, yet I do believe that I may say, without arousing any contradiction, that in general the mortality statistics of myomectomy cannot be placed under 3 per cent. At the same time it must not be forgotten that with regard to the above, a selection of cases is often made, in that myomatous subjects with bad heart complications, with edema and with high-grade anemia are quite

often refused by the operators, while in the case of Röntgen ray treatment a restriction of this kind naturally does not exist. We, on the other hand, although the most desperate cases have been submitted to us, have still carried out the radiotherapy in every case.

One further advantage of radiotherapy over the operative treatment I should like to direct attention to, namely, that the after-effects which we observe after myomectomy combined with removal of the uterus, are decidedly less with Röntgen ray treatment. There undoubtedly do often appear after-effects with Röntgen ray treatment of myomata, nervous excitement and heat palpitation, but still they are not to be compared in the slightest degree with those experienced by the woman whose uterus has been removed.

It cannot be denied that radiotherapy also brings with it certain disadvantages. One disadvantage we must consider, the duration of the treatment, which up to the present time has been relatively long. Following the technic which we use, an average of five to eight sittings is necessary, which are undertaken at eighteen-day intervals, therefore the time of treatment always lasts from three to four months. By the operative treatment the patient may, if all goes well, be allowed to depart from the clinic after about three weeks, then of course her ability to do work is still further reduced for quite four to six weeks, during which time she is convalescent. But, all this considered, the real duration of treatment is shorter than by the radiotherapeutic method. On the other hand the advantages of radiotherapy are overwhelming; the patients are able to continue their work during the whole time of treatment, they suffer no pain, and finally they need not live in the clinic. It is probable from our previous investigations, that one can shorten the duration of treatment somewhat, by the combination of Röntgen rays with mesothorium and radium. Nevertheless I should like to emphasize the fact, that the number of treatments should not be too few, for the simple reason, that, if we only continued treatment until the desired amenorrhea was obtained (which occurs usually after three or four treatments) then menstruation begins again later on. In consequence of this fact, we to-day take the standpoint, that in order to make the result certain we should give two more treatments after the desired amenorrhea has been attained.

Formerly a further disadvantage of Röntgen ray treatment had to be considered, in that injuries to the skin sometimes followed. We also did not escape these skin lesions. But we can state with

certainty that with improvement in technic and apparatus these skin injuries are no longer encountered by us. After we began to filter the central rays through aluminum and to intercept the peripheral rays by a suitable apparatus, according to the principles laid down by Gauss and Lembcke in their work on "Deep Röntgen-therapy," no skin lesions, or at most only the slightest, have occurred in the last three years; this objection, which could justly be advanced before, therefore no longer exists.

From the great similarity existing between the Gamma rays of radium and mesothorium and the x-rays, it is easily understood why the treatment of myomata with mesothorium and radium rays was very soon adopted. The results could not be good until the Alpha and Beta rays which emanate from radium and mesothorium, and which have only a very slight penetrating power, were eliminated according to the procedure of Dominici. For it is quite clear that one can only obtain a sufficiently deep reaction without burning the skin, if this undesirable mixture of rays is absorbed by means of a filter.

Further it is clear, since the Gamma rays constitute only about 1 per cent. of the whole ray output of radium and mesothorium, that we can only obtain satisfactory results if we proceed with the treatment with relatively high doses of the active elements of radium and mesothorium. The principal points of the technic are here outlined. One must apply the radium or mesothorium either to the abdominal surface, in which case one lays flat capsules containing radioactive substance on the skin of the abdomen; or one may apply filtered capsules containing radium, per vaginam; or finally one can proceed by way of the uterine cavity by passing the filtered mesothorium capsule into the cavum uteri. The intrauterine treatment has the advantage that one accomplishes the desired object with relatively small doses. It has, however, the objection that with intrauterine manipulation, rises of temperature to 102.2° F. may often happen, an occurrence which is probably of no consequence to the patient, but which is nevertheless a complication arousing some anxiety. A further disadvantage, which is perhaps avoidable, we desire to mention, that in addition we have observed in two cases a stenosis of the cervix with resulting formation of hematometra. Nevertheless it appears to us that this complication can be avoided with a sufficient degree of certainty. In general we have given the preference to the vaginal and abdominal method of treatment, rather than to the intrauterine method, without however wishing to deny that the intrauterine procedure offers certain

advantages because of the rapidity with which the desired amenorrhea is obtained.

It was a simple matter then to also apply the Röntgen and mesothorium treatment to other more or less benign tumors in the body. Our investigations are as yet in part unfinished but I believe, in order to give some stimulus to the discussion, that our experience ought to be briefly reviewed.

First of all I should like to emphasize that we have endeavored to attack in the most intense manner possible the pathological benign tumors of the ovary including the adenocystomata and the papillary cystomata with Röntgen rays and mesothorium. At last we gave very large doses, but we must lay stress on the fact that we cannot report any single successful result in cases of cystoma of greater size than a man's fist. In the case of several of the patients treated by us the tumor has even grown rapidly under the treatment. It would appear therefore that tumors of the ovary if they have reached a certain size are completely refractory to radiotherapy. The *small* cystic swellings of the ovary behave somewhat more favorably.

From the great similarity which the tissues of the prostate have to the fibroma of the uterus, it is only in the nature of things that we should also employ Röntgen and mesothorium treatment here. The application of the mesothorium is simply carried out from the rectum so that the tumor is only separated from the mesothorium capsule by the rectal mucous membrane. Our experience is limited. We have in all treated only three cases, of which two are in so far essentially improved that the prostatic hypertrophy is very appreciably decreased to the sense of touch. The bladder troubles have improved but as might be expected in a much hypertrophic senile bladder, only partially so. The remaining case is at the present time still under treatment.

Finally we have, as has also been done by other investigators, taken goiters in hand. Often we have seen a marked retrogression of the glands under mesothorium treatment alone.

While hitherto we have found ourselves on fairly firm ground, and while we venture to express the belief that in the case of many of these benign tumors radiotherapy will permanently take the place of operation, yet the circumstances are by no means so favorable in the case of malignant tumors. The difficulty is based principally upon the necessarily long time of observation which we must still have after the treatment of malignant tumors, in order to be able to say that the case is definitely cured. The operator, after the

extirpation of a primary carcinomatous swelling, demands rightly a time for observation of at least four to five years, and he counts the success of his treatment according to the percentage of cases of absolute cure, that is to say from the number of recoveries of all the cases, which have come under treatment, irrespective of whether they were operable or not. The treatment of carcinoma by Röntgen rays was proposed many years ago, as far back as 1896, as I need hardly remind you, by American surgeons, among whom I may mention, Johnson, Merrill, Clark and Williams, Pfahler, Chamberlain, Cleaves, Skinner and Coley, and we might be tempted to think we already possess fairly permanent results. But still all these attempts we venture to state have been made in part with faulty technic, and in part without the combination of Röntgen rays with radium and mesothorium treatment respectively. And this appears to me to be important because the Röntgen treatment of uterine carcinoma and also of other deep-seated carcinomata, presents great difficulties, because the carcinomatous tissue lies too far distant from the anticathode. In those days we were still without any Röntgen tube which would allow the anticathode from which the rays proceeded, to be brought as near as possible to the diseased tissue, and therefore the loss through distance was too great a one. Mesothorium and radium treatment respectively have this advantage over Röntgen treatment, that the former agents can be brought as close as possible to the required place near the carcinomatous tissue.

Moreover we must not forget that the method of treatment in vogue at that time was as yet not a method of choice, in that it carried into effect the entire admixture of rays without filtration of the oftentimes harmful soft rays. It is also not saying too much if we maintain that the deep action is only to be obtained (1) in the case of Röntgen treatment, by the application of the filter method in intensive ray treatment, and (2) in the case of radium and mesothorium therapy by means of the filtration method introduced by Dominici.

Superficial carcinomas were indeed attacked so early by Röntgen and radium treatment, that we know now that permanent results certainly occur here in a great percentage of cases. Not so, however, with the action on the deeply rooted carcinomas or in the cancers which were deeply situated in the organism from the first, and which never reached the surface. Up to the present time we have not obtained lasting results in a sufficiently large number of cases of this kind. We must content ourselves with the after-results ob-

served during only too brief a time. I would like to give a short summary of our results.

We have treated altogether 254 cases of cancer with Röntgen rays and radium. This material includes those cases treated for prevention of secondary 'growths after operation for carcinoma as well as those cases in which radiotherapy of carcinoma has been used therapeutically. Of these 254 cases, 150 were treated on purely therapeutic lines and without operation. Of these 150 cases, 140 were treated with Röntgen and mesothorium combined, while in ten cases Röntgen rays alone were used.

The cases treated prophylactically after operation for carcinoma appear to me to be an important argument in favor of the superiority of the Röntgen filter method over the treatment in which soft tubes are used. For the prevention of secondary growths we have carried out the treatment in sixty-four cases. Of these sixty-four cases of carcinoma, forty-three were treated for the prevention of secondary growths almost exclusively with unfiltered Röntgen rays, while twenty-one cases were treated partly with filtered and partly with unfiltered rays. The difference is striking. While twenty-three cases out of the forty-three undoubtedly died of carcinoma, we have been able to follow the subsequent history of twenty out of the twenty-one cases. Nineteen cases are without doubt free from secondary growths.

Still we must add by way of limitation, that comparing the cause of development of the unfiltered with the filtered ray treatment, these filtered cases have not been long enough under observation. Nevertheless of the twenty cases which we were able to reexamine after an interval, seven were seen after one year and thirteen after two years. Of these thirteen cases we find healthy: One case after five years, two cases after four years, one case after three years, nine cases after two years. If we consider that, according to experience, quite 60 per cent. of the recurrences come under observation during the *first* year after operation, I still believe that these figures carry considerable weight as evidence.

If we turn now to the carcinomas treated by radioactive substances in a purely therapeutic way, we have for observation 140 cases in all, which were treated with Röntgen and mesothorium. It appears to us, when we sift our material in this way, that three groups of carcinomata should be differentiated.

(1) Those in which the carcinoma has *not* spread beyond the *primary* focus; in general those cases in which the operative removal of the cancer was still possible.

(2) The carcinomata to which the new growth has already extended beyond the primary focus into the neighboring tissues, as, for example, in a cancer of the cervix where the carcinomatous growth has spread into the parametrium and to the glands, so that a purely operative course of treatment is out of the question.

(3) Those carcinomas in which, in addition to the primary focus, metastases in other organs are already present.

So far as our investigations up to date extend, we can state the following as the result of our observations: We have *not* succeeded by means of the technic employed by us in curing a single case of metastatic carcinoma. It is quite possible of course, as must be particularly emphasized, to produce quite remarkable retrogressions, and a checking of growth in the carcinomatous metastasis by means of intensive radiation of Röntgen rays and radium, but in all cases up to the present time, the carcinoma has later on spread further. We cannot say that we have saved a single patient.

Of the second group in which the carcinoma has already spread beyond the primary focus and is to be found in the glands, and, for example, in the parametrium in the case of uterine carcinoma, we may say at the present time that the majority of these cases are at all events impossible to cure in spite of the most intense Röntgen and mesothorium radioactivity. We have observed here remarkable and transitory retrogressions and cessation of growth but as far as we can judge at the present time further growths begin again after a certain length of time. A certain percentage, which unfortunately it has been impossible for us to ascertain up to now, react for reasons hitherto quite unknown, remarkably well to the intensive mesothorium and Röntgen treatment; that is to say we observed complete retrogression of the carcinoma, not only in the primary focus, and in the adjacent tissues, but also in the glands, so that carcinoma could no longer be found, during a time of observation extending somewhat over a year.

The *best* results are offered naturally enough by the *first* group of carcinomata, in which are included the cancers in which the operation may still be carried out and in which the carcinomatous tissue has *not* advanced beyond the primary focus. These cases are especially suitable, as it appears, for Röntgen and mesothorium treatment, since for the most part, as far as can be shown histologically, we are able to recognize a complete disappearance of cancer. Even on deep incision into the tissues, we are no longer able to establish the presence of carcinoma. That this is not merely a superficial action but really a deep one, is made quite clear by the case which was his-

tologically most carefully examined by Professor Aschoff of Freiburg. It was a case of gastric carcinoma. At the exploratory laparotomy a carcinoma of the stomach the size of a man's fist was disclosed and a piece removed for examination. The patient died from inanition as a result of pyloric stenosis following gastroenterostomy, but the autopsy showed macroscopically no evidence of cancer, while microscopically only a few isolated cancer cell nests were to be recognized at points scattered over the stomach wall.

If now we turn to a *resumé* of our observations we can state the following: In *deeply* seated carcinomas with metastases we are, in our experience, still as much in the dark as we were before, in spite of Röntgen ray and mesothorium treatment. In cases of carcinomata which have advanced beyond the primary focus and which have spread into neighboring connective and glandular tissue, cases which may in general be considered to be inoperable, we may consider a small percentage to be cured.

In the operable carcinomas the results are still the most favorable. But here too we must deplore the short time during which the cases have been under observation. The longest observed case in our series was that of a large carcinoma of the abdominal wall, and even that only dates back two years.

We must therefore not expect too much of Röntgen and mesothorium treatment in malignant tumors. If however a relatively large percentage of operable cases remain permanently cured the success of the treatment would still be sufficiently great, for we know that especially in operations for carcinoma of the genital organs we find a high mortality rate, amounting in the case of operation for carcinoma of the cervix, even to 25 per cent. Should we really succeed in avoiding these operations we should, in my opinion, have achieved a great work.

SOME OBSERVATIONS AND CONSIDERATIONS ON THE UMBILICAL STRUCTURES OF THE NEW-BORN.

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THE following observations, which were made quite incidentally in the course of other investigations, do not presume to be comprehensive or inclusive. Some need amplification and the interpretation placed upon others may need qualification. Nevertheless, since

they concern a number of species and reveal new facts which have a direct bearing upon the old question of hemorrhage in the new-born and the obliteration of the umbilical vessels and ligaments, they seem worth recording.

Since time immemorial it has been a matter of common knowledge that serious and fatal hemorrhage from the fetal end of the freshly torn umbilical cord, or from the umbilicus, is rare in the new-born of the domestic animals but comparatively common in man. However, from many observations on man, Haberda ('96) asserts that there would be no serious hemorrhage in the majority of cases in human infants even if the cord were not ligated, but he wisely calls attention to the well-known fact that hemorrhage may occur in the human infant in spite of such ligation. Nevertheless, the contrast between man and animals is a marked one and if one asks a layman why the young of domestic animals do not bleed to death at the time of birth one usually receives the reply that it is because these animals gnaw or bite off the cord. According to Miura ('12) cats actually delay the severing of cord until the vessels have contracted and their slight contents are *coagulated*, or they leave the process to nature. (?) Miura naively adds: "das tun sie nur instinctiv, also ohne fleissiges Studieren oder langzeitige Erfahrungen, solche geschickten Hebammen findet man gerade im Tierreich." (!) Unfortunately for Miura's inductions the cats which were observed by the writer did not show this remarkable foresight and had less patience. This was especially fortunate for the offspring, for the apparently delayed clotting of the blood contained in the fetal vessels is a very remarkable and at first sight a very contradictory thing, so that the spontaneous separation of the new-born from the placenta, if delayed until clotting occurred, would probably mean the death of the offspring in most cases unless hemorrhage were controlled otherwise.

From the experiments of Henneberg ('02) and Bucura ('02) we know that the amount of hemorrhage from the cord is dependent to a considerable extent upon the method of severing it and that tearing, gnawing and biting as practised by carnivora, rodents, etc., or hacking with a rough instrument as is the custom among primitive races of man, are very efficient means of preventing hemorrhage. However, ruminants and equidea do not gnaw or bite off the cord, and in them rupture is the result of traction produced by the precipitate nature of the birth, by struggles of the new-born or more commonly by the rising of the mother before the placenta is discharged. Moreover, the prolonged or at least the repeated licking and gnawing of the stump especially in carnivora and bovines is, no doubt, also an

important factor in the prevention of hemorrhage, for by this repeated stimulation the vessels are undoubtedly *kept*, even if not *brought*, into a state of more complete contraction much as is the uterus in the Credé maneuver. Especially in the dog, the mother repeatedly rolls the pup on its side or back in her attempts to lick, bite and gnaw at the stump of the cord. Even more purposeful would seem to be the action of the "Wanderratte"—a generic term I take it—which, according to Henneberg, is said to pick up the new-born with the forepaws and bite and gnaw off the cord very close to the abdominal wall. Yet the supposition that mechanical stimuli cause contraction of the umbilical vessels seems to be contradicted to a certain extent by the experiments of Lochman ('00) according to whom mechanical, chemical and electrical stimuli cause dilatation of the vessels, a result which is confirmed by Henneberg who thinks, however, that this is probably a transitory effect. Nevertheless that gnawing, tearing and biting are efficient factors in the production of contraction is undeniable and hence it seems that licking by some of these animals undoubtedly has a similar effect.

One of the strangest things connected with the behavior of the domestic animals after labor is the well-known fact that some of the herbivora even devour the placenta. Were this habit limited to those carnivora or herbivora, as the rabbit or guinea-pig, which bite or gnaw off the cord, or to omnivora, the procedure would not seem so strange as it is in those whose repugnance to and refusal of a meat diet is proverbial even if not physiological.

We know that the human umbilical cord sustains a weight of 10-15 kg. before tearing and that it practically always gives way near the placental end. Since the average weight of the human new-born is but 3 kg., it is evident that the human cord is so strong that there is little possibility of spontaneous rupture as is constantly the case in animals, even if traction were made on it by the full weight of the fetus, unless subjected to a sudden and severe strain as is the case in precipitate labors. While no data regarding the strength of the cord of the new-born calf or of other new-born animals are available, it is evident from the comparative size of the bovine cord and from the comparative weight of calves, as well as from the behavior of the cord after labor, that the cords of the latter are manifestly not twelve times as strong as those of infants, and yet this would seem to be necessary in order to preserve the same relative strength. Moreover, it is well known that the cords of horses, cattle, sheep and goats practically always tear very near to the umbilicus and not near the placenta as is the case in man. According to Haupt-

mann ('11) the umbilical cord in the horse, as first stated by Gmelin, is destined to tear at a certain predetermined point very close to the umbilicus. Hauptmann describes the cord at this point as being smaller and as possessing certain other interesting structural peculiarities which cause a weakening in this region. It is also evident to anyone who has personally observed the birth of a considerable number of domestic animals that rupture of the cord apparently occurs easily in some of them, although rarely the new-born must make a prolonged and vigorous struggle to free itself if the mother does not come to the rescue. The latter is the case in dogs, and I seriously doubt whether the struggles of the pup could free it should the mother fail to do so preliminary to devouring the placenta, for the membranes are often intact when the pups are born.

Another striking difference between man and animals is the great length of the human cord. Hauptmann quotes Gmelin as saying that in the colt the cord is but 70 cm. long. The new-born colt measures 120 cm. Moreover, the colt's cord is only from 2-5 cm. in diameter while the human cord has an average diameter of approximately 1-1.5 cm. Hence here also a marked disproportion in strength exists between the two.

That the cord of bovines is also comparatively weaker is suggested by the ratio of the weight of the placenta to that of the new-born. This, according to Albrecht ('11), is as 1 to 7 in bovines, but as 1 to 6 in man according to Williams ('03). Moreover, it is very probable that the disproportion between the cords is much greater than that between the placenta. Hence it is not at all unlikely that it is this disproportion in strength between the cords which, *in part* at least, is responsible for the fact that umbilical herniæ are not comparatively commoner in the domestic animals in spite of the fact that rupture of the cord in many of them is the direct result of traction on it and on the abdominal walls, for even in dogs the method of separation is one of tearing rather than of biting or gnawing. Hence in these mammals the cord must either be proportionately weaker or the abdominal wall relatively stronger, for it is well-known that severe traction on the human cord is very apt to disturb the integrity of the abdominal wall and at least predispose to, if not actually result in the formation of an umbilical hernia.

According to Hauptmann it was formerly not an uncommon practice among German veterinarians to wrap the cord of a new-born colt around the hands, stem the foot against the abdominal wall of the colt and rupture the cord with a jerk. At first thought such a

procedure seems unnecessarily rough, but if it is borne in mind that in the horse rupture often takes place as a result of a more gradual and therefore a more dangerous tension, it will be evident that, aside from the question of hemorrhage, the above practice was after all even less objectionable than the usual and natural one. Moreover, in dogs which bite and tear the cord directly after labor the tension made on the abdominal wall is severe, repeated and prolonged far beyond the duration of a jerk. In fact the process usually seems such a serious menace to the life of the pup that one feels impelled to play the rôle of the meddling midwife and to interfere in behalf of the pup.

These differences between man and animals are emphasized still further by the fact that the new-born of most of the domestic animals are on their feet as soon as born or at least a few minutes or half an hour after birth. Consequently the umbilical region is subjected to a direct and severe tension. In the human infant, on the contrary, the cord is severed with all avoidance of traction, the infant is inactive, lies supine and is often protected by a pad and an abdominal binder of more or less efficiency, for the protection of the umbilical region against hernia, during the first weeks of life. Hence, we see that in the latter case all the external conditions are unfavorable for the formation of a hernia while in the former they are all directly provocative of it. Yet, in spite of these differences, umbilical herniæ, while apparently not at all rare in new-born animals, certainly *seem* much less common than in man, a supposition which can unfortunately not be thoroughly tested because of the absence of statistics.

While looking about for an explanation for these interesting differences among domestic animals an opportunity was unexpectedly afforded to make some observations on new-born lambs of the university flock. The old question as to the mechanism by means of which hemorrhage is prevented from the end of the proximal part of the torn cord of the domestic animals naturally seemed of great interest. Hence a search was made for peculiarities in behavior of the vessels and in the structure of the cord, which might be regarded as being in part or wholly responsible for any of the above differences. Upon examining the cord of lambs four to twelve hours after birth it was found that the stump is represented largely by a collapsed, longitudinally folded cuff or sleeve of the amniotic sheath containing a very small amount of Wharton's jelly of semifluid consistency in which two firmly retracted and contracted, pearly-white, tortuous, cylindrical cords with conical ends are contained. At first glance, or even upon palpation, one is likely to take these vessels for the contracted hypogastric arteries, but one looks in vain for a third structure

which might represent the unpaired vein so constantly present and so easily recognizable in the firm cylindrical stump of the human cord or of that of most of the domestic animals. The lumina of these contracted and retracted vessels which are about 3 cm. long and 3 mm. in diameter, as a rule, are completely obliterated and appear only as minute dots on the conical free extremity of the firmly contracted vessels. These paired vessels which are, of course, the paired umbilical *veins* and not the arteries, join intraabdominally immediately or soon after passing through the wall. Intraabdominally they are contracted only in the paired portion in the immediate vicinity of the umbilicus, as a rule, although occasionally the contraction, which is quite complete, extends practically throughout the entire extent of the vessel. This process in the veins of sheep corresponds to Hauptmann's observations in the horse in which contraction of the artery extends only as far as the inner abdominal ring. No remnants of the hypogastric arteries can be found in the collapsed stump of the umbilical cords of lambs, but upon slitting open the remnant of the latter and examining the abdominal wall at the umbilicus a small circular opening about 4 mm. in diameter is found directly caudal to the veins. It is evident that the hypogastric arteries must have retracted through the foramen or arterial umbilical ring at the time of birth or that they must have ruptured intraabdominally. Moreover, the ring must have contracted for it is much too small to accommodate the uncontracted vessels. In fact, it is usually not even large enough to accommodate them in the markedly contracted and retracted form in which they are found within the abdomen. This rapid retraction of the arteries and veins characteristic of *ruminants*, according to Hauptmann, is an unusually interesting phenomenon and the question naturally arises as to why it is possessed only by this class of animals.

Inspection of the abdominal cavity in the new-born lamb always revealed the ends of the hypogastric arteries intraabdominally projecting slightly intraperitoneally at times through a tear in the peritoneum, 2-3 cm. caudal from the umbilicus and lying in a fold on either side of the urachus with the conical apex of the usually dilated bladder between them. If the torn proximal ends of the arteries were once flush with the distal end of the stump of the torn umbilical cord, the amount of this retraction is as remarkable as the *rapidity* with which it occurs. Moreover, since this retraction which often amounts to 30 to 50 per cent. of the total length of the intraabdominal portions of the arteries, is also accompanied by a contraction of the musculature of the vessels which generally results in complete oblit-

eration of the lumen, it is evident that in order to counteract the lengthening effect of the contraction of the circular fibers the actual retraction of these vessels must be far greater than the apparent retraction. Although the arteries are somewhat smaller and firmer than the vein they nevertheless look almost exactly like the contracted extraabdominal portions of these vessels and cannot be distinguished from them macroscopically or even microscopically, as a rule, except by special methods or by careful examination. This similarity between the arteries and veins was observed also in the horse by Hauptmann, and it is especially interesting that this similarity or identity even is characteristic also of the microscopic structure of some portions of these vessels. Moreover, since according to Lochman the veins in the human fetus can be distinguished from the arteries only by a more pronounced development of their internal and external longitudinal musculature, no marked differences would seem to exist even in man. Henneberg, however, does not confirm these observations and conclusions of Lochman.

Since similar or even practically identical conditions were found in the arteries and veins of full-term sheep fetuses which died during labor and in lambs which survived birth only a few moments, as well as in lambs ten to fourteen days old, it is evident that most of this initial retraction and contraction must occur and very probably does occur immediately after rupture of the cord and is hence probably unaffected by the death of the fetus during labor.

This large initial retraction, however, is not the maximum or the only retraction which occurs, for in lambs five and one-half weeks old the arteries are removed much farther from the umbilicus and usually lie free in a fold of peritoneum several centimeters caudal to the vertex of the bladder. Since the latter has not only become less conical but has also receded decidedly from the region of the umbilicus it is evident that the distance between the free ends of the hypogastric arteries and the umbilicus which was only 2-3 cm., immediately after birth, may now be as great as 6-9 cm. or even more. It should be borne in mind, to be sure, that the evacuation of the bladder is probably not a negligible factor in this retraction even if it is difficult as well as rather immaterial to eliminate its effect in estimating the approximate distance of the free ends of the hypogastric arteries from the umbilicus. Since the bladder is usually distended before birth it is, of course, evident that considerable tension must be exerted upon the retracting hypogastric arteries when it is evacuated during or immediately after labor and that the hypogastric arteries will not only be stimulated but will be carried

alternately toward and away from the umbilicus with each succeeding distention and evacuation of the bladder.

In older lambs and sheep the retraction of the arteries is still more marked and very evident atrophy of their distal extremities has also taken place. Nevertheless they always lie in and under a fold of peritoneum on either side of the bladder, although not necessarily in direct contact with the latter, as firm, free, distinct and tortuous cords which are never bound firmly to the bladder up to its apex as in the cat, dog and some other domestic animals.

Robin ('60) who stated that the arteries remain attached to a short stump of the urachus in the horse added that this is not the case in carnivora. The latter I cannot confirm, for in the large series of dogs and cats examined the atrophied arteries could almost always be seen extending laterally from a small scar-like prominence at the very apex of the bladder, as fine pearly white filaments. The discrepancy in these observations may be accounted for perhaps by the fact that Robin may have examined only old dogs in which the distal fibrous representative of the atrophied hypogastric arteries which had completely degenerated can only be detected after distention of the bladder as an extremely fine, often discontinuous, cord.

The behavior of the umbilical veins in the sheep is in marked contrast to that of the arteries and this difference in behavior is largely due to the fact that *directly after rupture of the cord* they can retract only in their extraabdominal portions because their mural portions are held in place so firmly by fibrous attachments that they cannot be torn loose, even if sufficient force is used to tear the walls of the veins themselves. This firm attachment of the veins in the sheep, dog, cat and guinea-pig is in marked contrast to the conditions in man, in whom according to Herzog ('90 and '91) the vein has no intimate connection whatever with the umbilical ring. This statement would seem to require scrutiny, however, for in cats, dogs, lambs and rabbits it is attached very firmly. In the lamb only the extraabdominal portions of the veins are free to *retract* at the time of birth. The intraabdominal portion—that is, the common or unpaired trunk of the vein, or the paired veins when they exist intraabdominally—formed by the union of the extraabdominal paired vessels *contracts* somewhat in the immediate vicinity of the umbilicus, but *retraction* proceeds much later and gradually in the manner so well described by Robin in 1860. This delayed retraction, in the sheep, proceeds centripetally after the attachments of the vein or veins at the abdominal wall have been destroyed by degenerative processes. Moreover, it occurs somewhat later than that of the

arteries, a fact which Haberdas refers to the weaker musculature and smaller amount of elastic tissue in the vein, but, as will be stated later, it is not at all likely that other factors are involved.

It is well known that no such isolation and retraction of the extra-abdominal portion of the hypogastric arteries as above described for the vein occurs in the human infant and most other animals. There is, to be sure, a *contraction* of the extra- and to a far lesser extent also of the intraabdominal portions of the vessels, but the amount of retraction at the ends—that is, of the extraabdominal portions of the arteries—is so slight that it is practically negligible. Hauptmann states that in the colt also, the retraction of the hypogastric arteries in the cut ends of the cord is very inconsiderable and in no way comparable to the instantaneous retraction in ruminants. The same statement holds for dogs, cats, guinea-pigs, rabbits, etc., in which the extraabdominal retraction is practically negligible. It is apparent that there must be some structural peculiarities to account for the differences in the postnatal behavior of the extraabdominal portions of the veins. Upon examination it was found that in fetuses and infants, dogs, cats, rabbits and guinea-pigs both the veins and the arteries were firmly united to the abdominal wall, thus effectively preventing retraction into the abdomen before sloughing of the cord. It is evident, however, that although these parietal attachments prevent retraction of the intraabdominal portions of the vessels they manifestly cannot prevent retraction in their extraabdominal portions after the manner of the umbilical veins in the stump of the cord of the sheep. Hence it seemed likely that in the case of the human, carnivora, etc., there is probably less Wharton's jelly in umbilical cords or that the latter is less fluid or gelatinous, that is, more fibrous and cellular as in the case in the younger cords of both man and the domestic animals. It is well known that the intercellular substance or matrix of the cord increases with the advancing age of the fetus; that the cords of young fetuses are more cellular than those of older ones and that the human umbilical cord often loses its homogeneous structure as term is approached and may even show some stratification or lamination. Moreover, according to Wiere ('93), Wharton's jelly may be absent altogether in some places in the human cord and Hauptmann also states that aside from other changes more Wharton's jelly is present nearer the umbilicus in the horse, and that the connective tissue also becomes looser. The conception that the amount of Wharton's jelly is subject to considerable variation has also found its way into clinical literature, for Willis ('89) in writing on the question of hemorrhage from the umbilicus

declared strangely enough that "It is especially liable to occur when the cord is large and full of gelatinous matter."

This relative increase in the quantity of the matrix and its greater fluidity in the cords of sheep and bovines may, to be sure, be due to an earlier and more pronounced degeneration or, perhaps, more properly speaking, to an earlier and completer transformation of the cellular and fibrous constituents. The full-term cords of the lambs and calves examined contained only a semifluid mucilaginous jelly most of which had run out of the torn end of the stump of the cord a few hours after birth. It follows, to be sure, that in such a medium the vessels must of necessity have been entirely free to retract and contract but in the human cords, on the contrary, as well as in those of nonruminants, the vessels are apparently held in place so firmly by the surrounding tissues that they can retract only a few millimeters at most. Were such not the case the stronger-walled hypogastric arteries of the human cord might be expected, to be sure, to retract much more completely even in their extraabdominal portions, than the thinner-walled veins of the lamb's cord.

From several specimens of cords of bovines which were inspected soon after birth it is also evident that the small amount of fluid or semifluid jelly and the absence of a long, definite umbilical cord permits the placental portions of the umbilical vessels to retract to a truly remarkable extent. I have unfortunately not been able to make measurements of the cords of full-term bovine fetuses before birth, but the placental portions of the torn vessels which are not formed into a definite cord measured scarcely more than 25 cm. in length some six to twelve hours postpartum in several placenta examined.

There also seems to be a difference of opinion as to the place of rupture in ruminants. Hauptmann speaks of "*hineinschnellen*" of the arteries which seems to imply that they rupture *extraabdominally*. The nature of Wharton's jelly, the relation of the vessels to the parietes and the occurrence of rupture of the peritoneum near the umbilicus in new-born lambs would seem to indicate that as the cord and the umbilical vessels are suddenly stretched, the arteries are pulled out of the abdomen to a certain extent and hence tear *extraabdominally, but at a point which, previous to traction, was intraabdominal*. Hence if the "*hineinschnellen*" of which Hauptmann speaks actually occurs it is probably largely in the nature of an elastic recoil, for if a sudden traction which is sufficient to rupture the vessels and the cord does not free the arteries from their loose attachments to the abdominal ring it is to be doubted whether the retrac-

tile power of the torn vessels could alone do so. It would seem, to be sure, that this simple question could easily be answered by observations on the torn end of the placental portion of the cord, but the few placenta of bovines examined offered no evidence in this regard because the nature of the cordal tissue and the absence of definite cords on the delivered placenta permit the vessels to retract so extensively and so independently that the relative position of the retracted ends is of no value. In one case, for example, in which a sleeve of amniotic sheath 10-12 cm. long, containing no palpable remnants of the umbilical vessels, was found hanging from the abdomen of a calf, the ends of the four vessels on the placenta were practically parallel to each other even after being arranged. Hence it might be inferred that they tore at the same point but such a conclusion is not justified. Since, contrary to what was found constantly in lambs, no portions of the umbilical *veins* were found in the stump of these bovine cords it is evident, of course, that in these cases they must have ruptured flush with the abdominal wall during birth or soon after. The latter seems unlikely to me.

The conical nature of the free ends of the placental portions of the vessels was again a very striking thing and on examination was found to be due to the greater retraction of the longitudinalis or the more interlacing fibers of the media which lie next to the lumen and to consequent or accompanying contraction of the circularis, which thus and alone formed the conical tip.

Robin, who first called attention to the *delayed* retraction of the hypogastric arteries in man, and Baumgarten, who, according to Haberda, confirmed this process, believed that this delayed retraction of the intraabdominal portions of these vessels is likely responsible for the filamentous character of the distal extremities of the obliterated hypogastric arteries often seen in the bodies of adult human beings. Haberda, who confirmed this opinion, stated that the peripheral ends of the hypogastric arteries in infants are no longer fastened to the abdominal wall but have retracted several millimeters as early as two or three weeks after birth. Haberda further stated that in case of the arteries this retraction, which is not always simultaneous, amounts to about 2 cm. and in case of the vein to 1.5 cm., as early as one month after birth, but that by six weeks the ends of the arteries still extend beyond the vertex of the empty or partially distended bladder. At the age of three months they are said to reach the vertex of the bladder although they may still extend beyond it as late as five or six months after birth, and it is only after a year that they are constantly said to be found at the sides of the

bladder, a place which they reach within a few hours or moments even, after birth, in the new-born lamb. Consequently an amount of retraction which is accomplished rapidly within a few moments or hours, in the lamb is accomplished only gradually within the course of a year in the human infant. It is clear, to be sure, that the changes which take place in these widely varying periods of time in man and in sheep are not exactly identical, for the initial retraction in the sheep is of necessity a purely contractile and retractile and not a degeneration phenomenon. That there must be considerable individual variation, however, in the amount of this retraction in man, if Baumgarten and Haberda are correct, is evident, it seems to me, from the widely differing forms of the so-called obliterated hypogastric arteries which can be observed in the cadaver. This supposition is further confirmed by personal observations on the domestic animals as well as by the discrepancies between the observations of different investigators. Sömmering, *e.g.*, denied that a delayed retraction took place in man, but Robin in his admirable investigation confirmed its occurrence. However, Herzog, who made a special study of the human umbilical ring in its relation to the occurrence of umbilical hernia, again denied the occurrence of retraction, but still more recently Haberda and others reaffirmed Robin's conclusions. It seems not improbable that individual differences in the extent of this retractility may be dependent to a large extent upon the method of dressing the cord and the rate of healing of the umbilicus and whether or not infectious processes are present in the intra-abdominal portions of the vessels. A delayed cicatrization, *e.g.*, is known to lead to a delayed retraction and the more delayed the latter the less extensive it will necessarily be. It is not implied, however, that the filamentous nature of the paraumbilical or peripheral portions of the hypogastric arteries in man is necessarily due to or dependent upon a delayed retraction, or even to any retraction whatever, of the intraabdominal portions of the hypogastric arteries from the umbilicus, for the behavior and fate of the hypogastric arteries in the dog and cat make such a supposition untenable. As will be shown later, in these animals the free ends of these arteries generally become attached permanently to the apex of the bladder. Nevertheless, in the course of time the peripheral portions usually become transformed into very fine fibrous filaments which are scarcely recognizable macroscopically in old animals. But since no retraction of the distal ends from the apex of the bladder to which they become attached takes place, it is evident that if a large extent of the peripheral portions of the hypogastric arteries may be repre-

sented merely by very slender, scarcely recognizable fibrous filaments, these must have resulted from a transformation *in loco* and not from a secondary delayed retraction of these vessels from the apex of the bladder. Moreover, since no noticeable degeneration of the arteries occurs before this attachment is made and since fibrous filaments never occur between the umbilicus and the bladder in these animals it is evident, of course, that in the dog retraction cannot be responsible for or give rise to the existence of such filaments as Haberda assumes is the case in man. Moreover, no one has satisfactorily explained the origin of these fibrous filaments or their genesis in man, in regions in which complete retraction of the vessels which they displace has occurred. From the evidence to be presented later it is easy enough to see how a fibrous filament may be substituted for a vessel but it is difficult indeed to see why such a structure should be formed in places where the vessels early retracted unless they actually retracted within the adventitia as Robin thought. Haberda who denies the possibility of a complete degeneration of the peripheral portions of the hypogastric arteries into fibrous filaments without the retention of a remnant of the original lumen and wall of the vessel in man, asserts that "die Gleichheit der Gefässtructur in der ganzen Länge der Nabelarterie spricht an sich schon dagegen, dass ihre einzelnen Theile sich bei ihrer Rückbildung so ungleich verhalten sollten." In so far as this statement applies to man it may be correct but it cannot apply to such domestic animals as the cat, dog, rabbit and guinea-pig, in all of which such a complete fibrous degeneration of portions of the distal, even if not of the proximal, portion of the vessels often or perhaps always takes place if time enough be allowed. According to the older observations and conclusions of Robin, the vessels retract within the adventitia, which then together with the organized clot gives rise to the fibrous filaments. But such a retraction within the adventitia does not occur except to a very slight extent at the distal extremity, in case of the instantaneous retraction of the hypogastric arteries in the sheep and some other ruminants. Moreover, there is frequently no clot in the retracted hypogastric arteries in the cat or dog, and frequently not in the sheep, much less in the adventitia which retracts with the vessels, which could become organized and so assist in the formation of the fibrous filaments. Haberda who speaks of a fibrous transformation of the vessels asserts at the same time that the amount of retraction determines the length of the filamentous portions of the vessels, but it is evident that these are absolutely contradictory conceptions. Moreover, Haberda speaks of a retraction which

begins several weeks after birth and continues for one or more years. If the late retraction of the hypogastric arteries is a purely passive process accompanying growth and resulting from other factors, it is intelligible, but if it is supposed to be an active progressing retraction due to an active contraction of the musculature of the vessel itself its occurrence is exceedingly doubtful, it seems to me, at so late a day.

From the above facts it follows that in the sheep and ruminants as a class probably the differences in the nature or consistency of Wharton's jelly and the absence of firm attachments of the arteries to the umbilical ring are the conditions which enable them to retract not only rapidly but to a truly remarkable extent, and that this is a very effective even if not an indispensable mechanism for preventing serious even if not fatal hemorrhage in the new-born. While the absence of this strikingly protective mechanism of retraction in nonruminants does not of itself necessitate ligation of the cord, it can undoubtedly be responsible for hemorrhages which occur after the ligation has become detached and it is very interesting that such an effective mechanism for the prevention of hemorrhage is said to be present in ruminants only, in which prompt tearing of the cord near the umbilicus and especially the nature of the cord itself not only permits both veins and arteries to retract immediately but probably compensates for the failure on the part of these animals to perform an obstetrical service instinctively rendered by the female of many other species. Moreover, the absence of the firmly contracted arteries in the arterial umbilical ring permits the latter to contract unhampered immediately after birth, thus reducing the size of the opening and undoubtedly making the occurrence of umbilical herniæ somewhat less likely. Unfortunately it is not possible to obtain statistics on the incidence of umbilical herniæ in animals or to learn whether umbilical herniæ are less common in ruminants than in the horse and ass, for example. From the observations made on the structure of the umbilical ring by Herzog it is evident, however, that the more prompt and extensive retraction of the veins in the domestic animals and its complete disappearance in others may have a very important bearing on this question. It is also possible that in the sheep the contraction of the attached veins hastens or assists the reduction in size of the umbilical ring and so further helps to assure a more prompt and complete obliteration than is possible in man and nonruminants, in whom the vessels must remain *in loco* for several weeks until degenerative processes free them and make a delayed retraction of the intraabdominal portions possible.

It follows then from these considerations that all the essential mechanical disadvantages would seem to be on the side of the human being, in which the cord is three to five times as strong as is necessary to support the weight of the full-term fetus, in spite of the fact that accidental traction on the cord is likely to disturb the integrity of the abdominal wall and so predispose to hernia. Furthermore, as shown by Herzog, the structure and the relations of both the cord and the abdominal ring in man are such as to make effective retraction of the arteries impossible, and even if the vein were not prevented from retracting because of such attachments it apparently is prevented from doing so by the nature of Wharton's jelly. Indeed man's only mechanical compensation for these great and serious disadvantages apparently lies in the fact that in case of excessive traction in him the cord tears near the placenta and not near the umbilicus, thus helping to make accidental hemorrhage less likely and less serious. As an additional compensation man has, to be sure, the unique and crucial advantage of an incomparable intelligence, but even this is unfortunately not always adequate or to be relied upon in such a disturbing emergency as labor.

It is clear that the absence of this wonderfully efficient and remarkable mechanism in man and its presence in some of the domestic animals is hardly in accord with current evolutionary conceptions unless we are to assume that in man it has been lost through the adoption of, and the substitution for it, of other means suggested by his increasing intelligence. Such a supposition would not hold at all, however, in case of nonruminants in which no retraction occurs and which are absolutely helpless in face of this emergency. It is interesting that among primitive races the umbilical cord is said to be severed by hacking with some crude instrument. It is manifest, of course, that the bruising and laceration to which the vessels of the cord are subjected under these circumstances are almost as effective a means of preventing hemorrhage as gnawing or biting even if not as effective as the tugging seen in carnivora and rodents.

As previously stated, it is known that the method of severing the umbilical cord largely determines the amount of hemorrhage. This was established by Henneberg on rats and by the experiments of Bucura on dogs and rabbits. Moreover, Hauptmann states that in case of spontaneous rupture of the cord in new-born colts seldom more than half a teaspoonful of blood is lost but that if the cord is cut with a sharp knife the hemorrhage is so severe that ligation is usually necessary if not imperative.

The varying prominence and shape of the umbilicus in different

animals is a very interesting fact. In dogs, cats, guinea-pigs, rabbits and mice one must search very carefully indeed in order to locate it even in young animals, while in old animals it usually is not visible at all. Occasionally, however, when it is not visible it can be felt as a slight depression. The same is true of horses, but in bovines the site is frequently marked by a more or less decided prominence.

According to Stutz whose conclusion is confirmed by Haberda, the umbilication of the abdominal wall in man is due to the traction of the contracting and retracting hypogastric arteries. Haberda insists, however, that the process is not so much an umbilication of the floor of the umbilicus as an infolding of the cuticular wall manifested first at the caudal border of the stump of the cord soon after birth and which increases during the first few days of life.

Since the hypogastric arteries of all mammals except ruminants exert a similar traction upon the umbilicus one should *a priori* expect a corresponding umbilication to take place in all species. This is, however, not the case. One reason why the umbilicus is comparatively much shallower in carnivora and rodents, etc., can likely be found in the fact that in them the hypogastric arteries become detached earlier from the abdominal wall than in man and that man's posture is different. An additional factor, it seems to me, must lie in the fact that the intrauterine position of the human fetus is a somewhat different one. Hence with the assumption of the extended posture of the trunk after birth considerable traction must be exerted upon the umbilical region by the arteries through the change of posture alone. Moreover, this traction is further increased by the onset of respiration, for as the diaphragm is forced caudally with the first inspiration the abdominal pressure is increased and the abdominal wall is forced out. Since the diaphragm never again assumes as high a position cranially *after* as *before* the first inspiration, it is also evident that there probably is a slight amount of relaxation of the umbilical vein, as a result of which a correspondingly greater amount of traction is exerted by the arteries. Nor does it seem unlikely to me that this relaxation of the vein and certain factors to be discussed later is the chief reason why separation of the vein from the umbilicus occurs at a later period than separation of the artery. In the case of ruminants no such marked change in body posture takes place and no traction at all can be exerted by the arteries because their free ends become intraabdominal when the cord ruptures. Besides in quadrupeds the tendency of the intraabdominal pressure to force the umbilicus outward is assisted by the effect of gravity and tends to neutralize the effect of traction on part of the

arteries. Besides, even in nonruminants a much earlier separation of vessels from the umbilicus takes place than is the case in man. It seems unlikely, however, that this explanation is entirely adequate and it seems to me that the main reason for the *early*, as contrasted with the *permanent* umbilication and depression, lies not in these mechanical factors but in the structural conditions at the umbilicus itself. For in sheep in which traction of the arteries can, of course, not be a factor, a slight depression is nevertheless formed as a result of sloughing of the cord and the epidermis is curved inward at the margins as soon as cicatrization begins.

Since some of the above questions and considerations could only be answered by a careful anatomical study a series of observation on and microscopical examination of the fetal vessels and ligaments were undertaken. The facts so revealed are recorded in an article on the "retrogressive changes in the fetal vessels and the suspensory ligament of the liver" (Meyer '14) upon which the following conclusions are largely based.

SUMMARY AND CONCLUSIONS.

1. The umbilical arteries of ruminants very likely rupture extra-abdominally but at points which were intraabdominal previous to traction.
2. Complete and immediate contraction of the arteries and of the extraabdominal portions of the veins is made possible by the semi-fluid consistency of Wharton's jelly in these animals.
3. The suspensory and round ligaments of the liver are purely fetal structures in both the dog and the sheep. They degenerate very early in life and a true round ligament never exists in them.
4. Portions of both of these structures persist somewhat longer in cats, rabbits, guinea-pigs and rats, in which a more or less permanent round ligament is formed, but neither ligament was ever seen well-preserved in old cats and rabbits.
5. Degeneration and disappearance of the umbilical vein proceed centripetally and remnants of the original lumen are not necessarily preserved in the more or less temporary round ligament which may be formed in some of these animals.
6. The omphalomesenteric veins persist for an unusually long time after birth, especially in cats, and they and the degenerating umbilical vein—except in the dog and sheep—may come into relation to the peripheral venous system. In case of the omphalomesenteric veins the establishment of this relationship is always preceded by

detachment at the umbilicus and secondary attachment elsewhere. The detached degenerating umbilical vein of the dog and sheep may also obtain such an attachment but it never comes into such relationship with the peripheral venous system.

7. No thickening or proliferation of the endothelium of the intima was observed in the umbilical and omphalomesenteric veins or in the hypogastric arteries of any of these animals, and thrombosis is not a constant or important factor in the process of obliteration.

8. Fibrous transformation of the hypogastric arteries is due to degeneration of the media accompanied or followed by an in-growth of connective tissue which is directly continuous with the preexisting, subintimal, intramedial or adventitial connective tissue.

9. The presence of an elastica interna is subject to some variation but it is usually easily demonstrable even in the extraabdominal portions of the arteries and veins of the sheep in which the media contains many elastic fibers.

10. Embryonic regression of the media of the umbilical vein occasionally begins before birth and a budding or streaming of a syncytial-like media into the lumen was also observed.

REFERENCES.

1. Albrecht, 1911. Gewichte von Kühen vor der Geburt und nach Abgange der Nachgeburt u.s.w. *Münch. Tierärztl. Wochenschrft.*, Nr. 7. Accessible in review only.
2. Bucura, C. J., 1902. Ueber den physiologischen Verschluss der Nabelarterien. *Arch. f. gesam. Physiol.*, Bd. xci.
3. Haberda, A., 1896. Die fötalen Kreislaufwege des Neugeborenen. Wien.
4. Hauptmann E., 1911. Ueber den Bau des Nabelstranges beim Pferde mit besonderer Berücksichtigung der natürlichen Rissstelle. *Arch. f. Anat. u. Entwicklgsch. (Anat. Abt. Archiv. f. Anat. in Physiol.)*
5. Henneberg, B., 1902. Beiträge zur feineren Struktur, Entwicklungsgeschichte und Physiologie der Umbilicalgefäße des Menschen. *Anat. Hefte*, Bd. xix.
6. Herzog, W., 1890. Ueber die feinern Vorgänge bei der Bildung des Nabelringes. *Ibid.*, Bd. xix.
7. Herzog, W., 1891. Ueber den Rückbildungsprozess der Umbilicalgefäße. *Verhandl. der Deutsch. Gesellschaft. f. Chir.*, Bd. xx, Berlin.
8. Lochman, F., 1900. Zur Anat. u. Phys. der Umbilicalgefäße. *Inaug. Dissert.*, Heidelberg.
9. Meyer, A. W., 1914. Retrogressive changes in the fetal vessels and the suspensory ligament of the liver. *Am. Jr. Anat.*, vol. xv.
10. Miura, M., 1912. Aus den Notizen meinerp hysiologischen und pathologischen Forschung. Tokyo.

11. Robin, Ch., 1860. *Memoire sur la retraction, la cicatrication et l'inflammation des vaisseaux ombilicaux et sur le systeme ligamenteux qui leur succede. Memoires de l'acad. Roy. de Med.*, T. xxiv.

12. Wiere, O., 1893. Ueber einen seltenen Fall von Rissverletzung der Nabelschnur. *Inaug. Dissert.*, Kiel.

13. Williams, J. W., 1903. *Obstetrics*. New York.

14. Willis, H. F., 1889. Hemorrhage from the umbilicus. *Med. and Surg. Reporter*, Phil.

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PITUITARY EXTRACT IN OBSTETRICS.

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THE extract obtained from the pituitary gland is a rather new therapeutic adjunct to the obstetric field and has hardly received the attention that it deserves. Foreign periodicals have published many articles on the subject, but aside from abstracts of these articles only very few papers on this subject have appeared in American journals until within the last few months, and probably only a few American physicians have any knowledge of this preparation aside from what they have read in advertising circulars sent out by manufacturing concerns. Knowing how exaggerated and overenthusiastic these circulars generally are, physicians are skeptical, have but little faith in them, and have hesitated to try out this drug. It is for this reason that I have thought it worth while to make this report of my experiences in a small number of cases.

The pituitary gland is divided anatomically into three parts, the anterior and posterior lobes and the infundibulum, but physiologically it seems to be divided into only two parts, the anterior lobe having one action, the posterior lobe and infundibulum another. The anterior lobe contains some unknown substance which is absolutely necessary for the life of an individual. The posterior lobe and infundibulum, on the contrary, are not indispensable to life, but contain some principle which has a marked physiological action as a vasoconstrictor and uterine stimulant. To the best of my knowledge, there are on the market to-day only three extracts of pituitary gland, two made by American and one by a foreign firm, and all of them from the posterior lobe or infundibulum.

Two of the preparations each contain 0.2 gm. of the fresh posterior lobe to each the centimeter, while the third contains 0.1 gm. of the fresh posterior lobe and infundibulum to each cubic centimeter.

I have now used this drug in a number of cases and feel that in it we have the solution of many a difficult obstetric problem. I firmly believe that by its use many forceps operations can be entirely avoided, that inertia uteri can almost be excluded as an indication for forceps, and that in many cases a "high forceps operation" can be converted into at least a "medium" and not infrequently a "low" operation.

In one large class of cases in which in the past the "low" operation has been frequently called for, pituitrin will almost invariably enable the patient to deliver herself, to her great satisfaction and that of her family and the credit of the physician who has refrained from interference, and has employed physiological rather than mechanical means to aid the delivery. I refer to that class of cases (Cases VI and IX) in which the head is at the outlet or on the perineum for a comparatively long time, the pains infrequent and ineffectual, the patient trying somewhat to help herself, but at the same time trying to restrain the advance either from fear of pain or because she thinks herself exhausted (which her pulse and general condition deny), and wants the physician to anesthetize her and do the work for her. In this class of case such a simple procedure as an intramuscular injection of pituitrin will usually work wonders, and I have seen such patients deliver themselves promptly after a few strong pains had been inaugurated by the drug.

In this class of cases the use of forceps entails practically no danger to the mother or the child, and their avoidance is chiefly to our own advantage. It may redound somewhat to the credit of a physician to have the reputation of a skilful forceps operator, but it is a fact that our most grateful patients are those whom we deliver normally. The laity do not ordinarily look upon a forceps operation as a very serious procedure, but nevertheless how often do we hear the wish expressed that we "may be able to bring the patient through without using instruments." The laity also cannot recognize the distinction between a "high operation" (one of the most serious operations in obstetric surgery, which should never be attempted by any but an experienced obstetric surgeon) and the "low operation" which is simplicity itself. There is practically no danger to the latter, but even the most expert of us have our troubles with the former, and the morbidity and mortality are fairly high. And most of our patients or their families can tell us of some friend who lost her child or has been an invalid for years as the result of severe tears, infections, etc. And it is for this reason that the laity *do* fear the suggestion to employ forceps, and the physician who can secure a

normal delivery in an "exhausted," pain-fearing woman by the simple expedient of drug administration gains the confidence and good will of his patients.

But there is another class in which the avoidance or at least the delay in the use of forceps is distinctly to the advantage of mother and child. I refer to those cases included in the classification of "high" or "high medium." There may be a slight disproportion between the passage and the passenger, the head is engaged but is slow in coming through the brim because the patient does not make proper use of her pains and does not know how to use her muscles. Again, in another type, the head is in the brim, the cervix not fully dilated but nearly so, with a thin wire-like edge, membranes ruptured and the pains almost constant. The cervix refuses to dilate further, and the patient, suffering intensely, cannot be induced to bear down and help herself. In both types of cases the patient is generally anesthetized and forceps applied and the infant dragged through the canal, usually not in the axis of the pelvis, and with severe trauma to the baby's head and the mother's soft parts, cervix, vagina, and perineum. Few general practitioners heed the warning that an undilated or undilatable cervix is a contraindication to forceps, and the results are severe lacerations of the cervix with chronic parametrial inflammations and scars in the vaginal fornices that make the poor patient miserable for life and tax to the utmost the resources of the specialists who attempt to relieve her sufferings. It is in these two types of cases that much can be gained by the judicious use of morphine to give the patient a little rest and relieve the intensity of the pains, followed in a short time by pituitrin to increase their power. I have seen pituitrin accomplish wonders in this class of cases in an incredibly short space of time, and would urge that before resorting to forceps in these cases this drug be given a trial. But at the same time let me sound one word of caution, be very careful about using this drug before the cervix is well dilated. It sometimes causes very powerful contractions, and I can readily conceive of its forcing the head through a friable cervix with such power as to cause severe lacerations. A few such cases have been reported in the literature. The drug sometimes acts with almost unbelievable violence as, for example, in a case in the practice of Dr. Robert T. Frank which he has kindly permitted me to mention. Shortly after the administration of the drug, the patient with each pain had such violent contractions that she assumed the position of opisthotonos. No harm was done, however, and the case terminated favorably for both mother and child. On the strength of this, in

those cases in which the cervix is not over four fingers dilated I give only one-half ampoule (0.05 gm.) of pituitrin at a dose. Furthermore, I would never use more than 0.1 gm. of any active preparation as an initial dose. If this dose does not give the desired effect it is always possible to repeat. But if 0.2 or 0.4 gm. be given as recommended by Edgar, and an extremely violent labor result, it is almost impossible to control the pains even by the administration of chloroform.

I shall now describe in detail several cases showing my experiences with this drug for the induction of labor and the treatment of cases already in labor.

CASES FOR INDUCTION OF LABOR.

CASE I.—Patient of Drs. S. M. Brickner and R. Ottenberg. Mrs. L. M., para-i, twenty-one years of age, at term, membranes ruptured two days previously, and there was no indication of the onset of labor. Pituitrin, 1 c.c., given with no effect. Labor was finally induced by means of the Voorhees bag; size No. 2 had no effect and was replaced by No. 3 on the following day.

CASE II.—Patient referred by Dr. J. Wisansky. Mrs. J. J., para-iii, aged twenty-five years. First labor; 14-pound child. Difficult forceps, died on third day, severe postpartum hemorrhage, complete laceration of perineum, repaired some months later. Second labor; 10 1/4-pound child, difficult forceps, adherent placenta, severe hemorrhage. Third labor; fetus large at term, estimated at about 10 pounds, and when two days overdue induction of labor was decided on. Abdominal and vaginal examination gave no evidence of the onset of labor, no uterine contractions could be felt, the cervix was closed. Pituitrin, 2 c.c., was injected into the left deltoid at 10.45 A. M. Hand on the abdomen noticed slight contractions of the uterus in three minutes, but the patient felt nothing. The contractions recurred at from four- to five-minute intervals, gradually becoming stronger for about fifteen minutes, and then continued at about the same rate and intensity for one hour when they ceased. At 1.07 P. M., one hour and twenty-two minutes after the first dose ceased to act, a second dose of 1 c.c. was given in the opposite deltoid. Similar contractions again began in five minutes and continued for nearly one hour. During this period of contractions, at 1.30 P. M., there was a show of bloody mucus. At 3.30 P. M., one and one-half hours after this second dose ceased to act, I decided to introduce a Voorhees bag, thinking that the pituitrin had failed. Preparations were made and on examining the patient I found, to my surprise, that the cervix was very much thinned out and almost completely dilated. Consequently, instead of introducing the bag I gave another c.c. of pituitrin and again the same result, contractions but no pains, lasting one-half hour. At no

time with any of the three injections did the patient feel anything at all. An examination was now made, and as full dilatation was found and the cervix fully retracted, the membranes were ruptured artificially and strong labor pains began at once. The head was large and hard and one and one-half hours elapsed before it descended into the pelvis. Delivery then progressed rapidly, but as soon as the child was born a very profuse hemorrhage began, and although the uterus was well contracted, the bleeding continued. After a few minutes unsuccessful attempts at Credé were made. The bleeding was very profuse, and as the pulse had risen to 160 I decided to waste no more time and did a manual extraction of the firmly adherent placenta. By this time the patient was in collapse, with symptoms of air-hunger and imperceptible pulse. The bleeding stopped, however, as soon as the placenta was out, but I packed the uterus firmly for fear of a possible relaxation and further hemorrhage, which would probably have proved fatal in the patient's already exsanguinated condition. Morphine and ergotole were given and the patient made an uneventful recovery. The baby weighed 10 1/2 pounds.

Epicrisis.—The question may arise as to whether the hemorrhage in this case was in any way connected with the use of the pituitrin. It has been claimed by some that pituitrin has an effect on the uterus similar to that of cocaine or adrenalin on the blood-vessels, *i. e.*, an excessive relaxation after the normal preliminary contraction. But I think that we can safely say that such was not the case in this particular instance for the following reasons: 1. The uterus did not tend to relax, but contracted well; the hemorrhage was external and the uterus did not balloon up with blood. 2. The history of postpartum hemorrhage in the first labor and adherent placenta in the second. 3. The placenta and membranes were adherent in this case, and the hemorrhage occurred while they were retained and the uterus well contracted upon them. 4. As soon as the adherent placenta was removed the hemorrhage ceased spontaneously. I packed, not to control hemorrhage but prophylactically, as I did not know what might happen and I feared that should another hemorrhage occur in her weakened condition it might prove fatal.

CASE III.—Mrs. V. D., para-i, aged twenty-three years. Pregnancy uneventful, pelvic measurements normal. Patient went two weeks beyond the estimated date of labor, and as I judged the child to be over 9 1/2 pounds decided to induce labor. Examination showed no evidence of the onset of labor, there were no uterine contractions, and the cervix was thick and closed. Two cubic centimeters of pituitrin were injected into the left deltoid, and six minutes later uterine contractions could be seen and felt through the abdominal wall. The patient stated that she felt a sensation

of pressure and tightness in the lower abdomen, and had to empty her bladder. I then left the patient with instructions to call me in two hours if the pains continued. She reported later that the pains had ceased after one hour. Next day I induced labor by means of a Voorhees bag. Labor was normal up to the end when, as the patient would not bear down, I was obliged to do a very easy low forceps without anesthesia. Placenta expelled spontaneously, no hemorrhage. Child weighed 10 $\frac{1}{4}$ pounds.

Epicrisis.—In this case the pituitrin undoubtedly caused uterine contractions, but nature was not ready to continue the work. It is possible that had I given another injection when the effect of the first wore off, as I did in Case II, and possibly even a third or fourth injection, nature might have taken up the work at this point. I believe also that I could have avoided the forceps in this case had I given pituitrin when the patient ceased using her pains, but I had no more with me and as it was 3.30 A. M., was unable to obtain more.

CASE IV.—Mrs. D. B., para-iii, aged thirty-two years. First full term pregnancy. Spontaneous abortion five years ago at two months. Hydatidiform mole four and one-half years ago, uterus emptied. Cured again four months later for suspected chorio-epithelioma, and was ill for nearly one year afterward with “pelvic inflammation.”

Present pregnancy uneventful. Four days after the estimated date of labor, as fetus was presenting in vertex, R. O. P. and of good size, I determined to induce labor. Patient sent to a hospital and Ol. ricini, 1 ounce, with quinine, gr. x, given without effect. The following morning, as examination showed no signs of the onset of labor, 1 c.c. of pituitrin was injected at 9.45 A. M. and in six minutes uterine contractions could be felt through the uterine wall, and at the same time the patient experienced a “tightening.” This passed off in one hour, and at 11 A. M. a second dose of 1 c.c. was given. The effect was the same but this time weak pains continued throughout the day and night at eight- to ten-minute intervals. At 2 A. M. the following morning there was a considerable watery discharge. At 9.30 A. M. as the pains were still weak another 1 c.c.-dose was given, followed at once by real labor pains. Vaginal examination at 11.30 A. M. showed cervix two fingers dilated, very thin, and the membranes ruptured. Pains became progressively stronger and more frequent up to 1.30 P. M., when I gave a small dose of morphine (gr. $\frac{1}{6}$) to relieve the pain but not interfere with the contractions. The head descended rapidly to the outlet, still in position of R. O. P., where it remained for some time notwithstanding strong pains. I then introduced two fingers into the vagina and with each pain made lateral pressure on the occiput, until rotation to R. O. A. occurred. Spontaneous delivery rapidly occurred, and the placenta followed very shortly. No hemorrhage. Child weighed 8 $\frac{1}{2}$

pounds. Convalescence uneventful up to eleventh day when patient had a chill and developed a most severe sepsis. Hemolytic streptococci were obtained in pure culture from the blood. After a long illness the patient finally recovered, and at a recent examination showed no traces of any pelvic disturbance.

CASES IN LABOR.

CASE V.—Mrs. M. L., para-iii, aged thirty-six years. First labor prolonged, 11-pound child born dead in absence of physician. Second labor, seen in consultation with Dr. A. Friedman. Transverse presentation, R. D. A., converted to breech, L. S. A. Very difficult extraction of very large child, nuchal hitch of left arm, cord ceased to pulsate before the arms were delivered, and head stuck in the brim. I was completely exhausted and finally had to call Dr. S. M. Brickner to deliver the head for me which he did with great difficulty. Child still-born, weight 12 pounds 14 ounces. Third labor, true conjugate estimated at 9.5 to 10 cm., fetus again large and presenting transverse, L. D. P. Consultation with Dr. Brickner one week ahead of estimated date of labor and induction decided on, on account of the size of the fetus, the malposition, and the contracted pelvis.

By external version the head was brought well down into the left iliac fossa with occiput posterior, and a No. 3 Voorhees bag inserted with ease. Pains began promptly, the bag was expelled in three hours, and the pains ceased. No pains occurred for four hours, so 1 c.c. pituitrin was given into the left deltoid; in six minutes pains began and soon became strong and frequent. With each pain the patient was required to assume the squatting position advised by Dr. King for transverse presentations. Examination one hour later and just after the membranes ruptured showed the cervix three fingers dilated, head in the left iliac fossa, and a hand and arm presenting below the head. These were pushed up out of the way, and with one hand on the abdomen the head was guided over the inlet where it engaged with the next pain. The pains ceased shortly after this, and after waiting two and a half hours another 1 c.c. dose of pituitrin was given. Again the pains began within five minutes, recurred at two-minute intervals and were very strong. One hour later examination showed head engaged L. O. P. and cervix four fingers dilated. Two hours later as there seemed to be no progress, notwithstanding strong pains, another examination was made and showed a contraction ring in front of the head, about 1 1/2 inches from the edge of the cervix and becoming smaller and tighter with each pain, but relaxing between pains. Two hours later this ring had contracted down to less than two fingers, while the external os was as wide open as before. A liberal dose of morphine and atropine was given by mouth and the patient slept for five hours. Pains then began again spontaneously and examination showed that the contraction ring had disappeared, and the cervix was almost com-

pletely dilated and retracted. As the head was still L. O. P., without anesthesia I pushed it up out of the pelvis, and while an assistant rotated the child's body, with two fingers in the vagina I rotated the head to L. O. A. Three hours later a 9-pound child was spontaneously delivered. The placenta and membranes were shortly expelled, no hemorrhage.

Epicrisis.—There is little to say about this case except to call attention to the promptness with which the pituitrin brought on the pains. The question as to whether the pituitrin had anything to do with the formation of the contraction ring, I will have to leave unanswered; I can find no argument for or against it, and can find no other reported case in the literature.

CASE VI.—Mrs. H. A. H., para-i, aged nineteen years. At term. Pelvic measurements normal except for slight degree of funnel shaped pelvis, transverse diameter of the outlet being 9.5 to 10 cm. Vertex R. O. A. Labor began spontaneously and progressed rapidly and smoothly until the head reached the outlet when the pains practically ceased. After waiting one and one-half hours, with pains only every ten or fifteen minutes, pituitrin 1 c.c. was given into the left deltoid. In eight minutes strong pains began, recurring at two-minute intervals, and the labor was spontaneously terminated in forty-five minutes. Placenta expelled spontaneously in thirty minutes, no hemorrhage. Child weighed 6 $\frac{3}{4}$ pounds.

CASE VII.—Mrs. C. S., para-ii, aged twenty-three years. First labor, normal but prolonged, thirty hours. Second labor, two weeks ahead of estimated date. Pains began spontaneously at 10 P. M. and membranes ruptured at midnight. Pains continued all night at six- or seven-minute intervals. Examination at 9 A. M. showed cervix two fingers dilated, $\frac{1}{4}$ inch thick, and head engaged in position of L. O. P. Pains continued all day at six- to seven-minute intervals, were weak and of only ten to fifteen seconds duration. At 6 P. M. examination showed cervix still only two fingers dilated and hardly any thinner than in the morning. One cubic centimeter of pituitrin was given, followed in one minute by a weak pain. These continued at minute intervals for six minutes, and then became very strong, lasting from thirty-five to fifty-five seconds and at intervals of from thirty to forty-five seconds. Fifty minutes after the injection of the drug the head appeared at the vulva and the child was born ten minutes later. Spontaneous rotation from L. O. P. to L. O. A. Placenta expelled spontaneously in seven minutes, no hemorrhage. Child weighed 7 $\frac{1}{2}$ pounds.

CASE VIII.—Mrs. S. F., para-i, aged twenty-four years. Pregnancy uneventful, pelvic measurements normal. Spontaneous onset of labor at 5 A. M. Vertex R. O. P. At noon cervix was two fingers dilated and fairly thick. Pains were rather infrequent and weak. At 4 P. M. rectal examination showed the cervix a scant three fingers dilated and pains still infrequent. Pituitrin (0.5 c.c.) given and in six minutes pains became very strong and frequent for one

hour and then again became infrequent and weak. After waiting three hours with no improvement, 1 c.c. pituitrin was given with immediate powerful effect for nearly one hour, when it again ceased. One hour later examination showed the cervix four fingers dilated and fairly thin so I ruptured the membranes and at once strong pains developed and continued until the head reached the outlet when they again ceased. After again waiting one hour with absolutely no pains and the head at the outlet, still R. O. P., I gave still another injection of pituitrin. This was at once followed by powerful pains, the head rotated and was promptly expelled. Placenta followed shortly, no hemorrhage. Child weighed 8 pounds.

CASE IX.—Mrs. A. M. A., para-i, aged thirty-two years. Pregnancy uneventful, pelvis normal. Labor short and strong up to the time of full dilatation when pains ceased completely for one hour. One cubic centimeter pituitrin given with immediate effect. Very strong contractions developed in four minutes and the child was born fifteen minutes later. Placenta expelled in twenty minutes, no hemorrhage. Weight of child, 7 1/2 pounds.

Epicrisis.—These four cases show plainly what pituitrin will do in cases of simple inertia.

CASE X.—Mrs. D. E. K., para-iii, aged forty-one years. First full-term pregnancy. Laparotomy for fibroids and ectopic gestation eight years ago. Induced abortion for safety of abdominal scar a few months later. Present pregnancy very stormy, nausea and vomiting throughout, severe abdominal pains and edema of feet. Patient was hardly able to get about at any time during the entire course of her pregnancy. Abdominal and vaginal examination showed practically normal conditions, pelvis normal. Two weeks ahead of estimated date of labor I decided to induce labor on account of patient's very miserable condition, advanced years, and an apparently fully developed fetus. A No. 2 Voorhees bag introduced with usual aseptic precautions at 9.15 A. M. and slight pains developed at once. These were augmented by an injection of pituitrin given twenty minutes later. A second, third and fourth 1 c.c. dose given at 12.15, 2.15 and 4.15 P. M. respectively had practically no effect. Another 1 c.c. dose at 9.15 P. M. immediately caused strong pains, lasting two hours, and then its effect ceased. At 1 A. M. strong pains began spontaneously and continued until the membranes ruptured and the bag was expelled at 6 A. M. Examination at this time showed the head well engaged in a position of R. O. P. and the cervix thin and nearly fully dilated. The patient was very weak from her stormy pregnancy, and although the pains were fairly strong, she could not bring any force into her bearing-down pains. For this reason I decided to give her a little respite, and at 8 A. M. gave her morphine, gr. 1/6 with atropine gr. 1/150. The pains ceased and the patient slept for two hours. Then two injections of 1 c.c. each of pituitrin were given with practically no effect. As pains would not occur and the cervix was fully dilated and the head

was well down in the pelvis, labor was terminated by an easy low forceps and Scanzoni maneuver. The uterus contracted well and there was no hemorrhage. But the placenta was not expelled, and after waiting two and a half hours a manual extraction was done. The placenta was found embedded in a mass of fibroids that divided the fundus of the uterus into several compartments. It was a most difficult extraction as it had to be removed piecemeal in shreds. Puerperium uneventful; weight of child, 6 pounds.

Epicrisis.—This is the only case in my series in which pituitrin given during labor failed to act satisfactorily. Each injection caused slight contractions but at no time was the result satisfactory. I cannot explain this but would not be surprised if the presence of the fibroids interfered in some way with the proper action of the uterine muscles.

This small series of cases will, I think, give a very good idea of what we may expect to accomplish with pituitrin in several different types of cases. Although its action is not infallible, I have, on the whole, been so well satisfied that I unhesitatingly recommend it.

The question now arises as to whether there are any dangers or contraindications to its use. I shall try to dispose of this in a few words. I believe that there may be some danger in certain classes of cases, and that these classes should be considered as contraindications. They are:

1. The dangers of severe tears in friable, rigid or diseased cervixes, where dilatation cannot occur or where the cervix is so soft as to rupture rather than dilate. In this class I would put carcinoma of the cervix, cervixes badly scarred from previous traumatism, operative or otherwise, and possibly also some cases of placenta previa. I would also mention here the use of full doses of pituitrin in cases where the cervix is only slightly dilated (two to three fingers).

2. The danger of rupture of the uterus where there is: (a) a weakened uterine musculature from fibroids or scars of former uterine operations, as myomectomies or hysterotomies; (b) a marked obstruction or disproportion between the passage and the passenger, and (c) transverse presentations, late in labor, either before or after the presentation has been corrected, if the uterus seems to be much thinned out at the site of one of the fetal poles.

3. The danger of raising an already too high blood pressure in eclamptics or nephritics.

4. Another danger to be considered, but one that cannot be foretold or guarded against, is the possible formation of a contraction ring as in Case V.

5. The danger of asphyxia of the infant. It has been stated by

several writers that pituitrin interferes with the placental circulation on account of the powerful contractions of the uterus, and that in many cases the child has been deeply asphyxiated and only saved with great difficulty. This may be so, but I have never had any difficulty in any of my cases, and have never had to resort to more active means of resuscitation than simple spanking. Although I do not know just how much pituitrin was given in some of these reported cases, I am led to believe from my own results that this is not likely to occur unless excessive doses are used.

Dosage and Indications.—Pituitrin should always be administered by intramuscular injection, and my preference for the site of injection is the middle third of the deltoid. I cannot agree with Edgar's advice, in a recent article, to use 0.04 gm. as an initial dose. I have been in the habit of using only one-quarter of that amount and with such excellent results that I see no object in using larger doses, and furthermore these larger doses might cause such violent labor as to do serious damage to the maternal soft parts. I cannot urge strongly enough that the initial dose be not over 0.1 gm. (1 c.c. of the Parke, Davis or 0.5 c.c. of the Armour or Burroughs Wellcome preparations) in all cases in which the patient is already in labor. In those cases where it is used early in labor with the cervix dilated to less than four fingers, and the membranes ruptured or unruptured, I would use only half this amount; where the cervix is dilated over four fingers and the membranes intact I would use the full dose, but if the membranes are ruptured, again I would use only one-half the dose. The rule of four fingers is arbitrary, but it has proven rather satisfactory to me for this reason: that where the cervix is less than four fingers dilated, the pressure with each pain comes almost directly from above, and the dilatation occurs chiefly by *retraction*, as there is very little protrusion of the rounded wedge into the cervical orifice. But after the cervix is four fingers dilated, the wedge, either consisting of the bag of waters or the head, is pretty well engaged in the orifice, and dilatation occurs by *actual dilatation or divulsion*. Now in this case if the hard head does the stretching too forcibly, severe tears are likely to result and I consequently advise smaller doses than where we have the soft bag of waters acting as the dilator.

After the cervix is completely dilated full doses can be safely given unless there is marked disproportion, obstruction, or weakening of the uterine muscle. These conditions with too violent a labor might cause a rupture of the uterus, but if no obstruction is present there is nothing to fear.

Where pituitrin is used for the induction of labor, large doses

(0.1 to 0.2 gm.) may be given with perfect safety. It would seem that so much of the energy of the drug is used up in starting the labor that the pains induced are never very strong at the outset, and the effect wears off before stronger pains develop.

CONCLUSIONS.

1. In pituitrin we have a drug that is of undoubted value in almost all cases of simple inertia and fatigue of the uterine muscle.
2. It is of value occasionally for the induction of labor at or near term.
3. It seems to be practically devoid of harmful effects, and its dangers are few and easily guarded against.

REFERENCES.

1. Brodhead. AMER. JOUR. OBST., Jan., 1913.
2. Edgar. AMER. JOUR. OBST., July, 1913.
3. Fries, H. *Münch. med. Woch.*, Dec. 19, 1911.
4. Humpstone. AMER. JOUR. OBST., Sept., 1912.
5. Stern, R. *Zentralbl. f. Gyn.*, Aug. 5, 1911.

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NOTE.—Since this article has been in press several new preparations of the pituitary gland have been placed on the market.

THE DIAGNOSIS AND TREATMENT OF PUERPERAL INSANITY.

BY

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A STUDY of deranged conditions of the nervous system, which frequently accompany or follow the pregnant state, reveals the scarcity of material in literature which deals with this subject in a clear and definite manner. It is difficult to find the proportion of insane cases, which have been precipitated by pregnancy and delivery, from a study of the records in hospitals and asylums, because they are not classified as such.

A puerperal psychosis, strictly speaking, is not recognized by the psychiatrist, but he classifies it with reference to the mental symptoms. The causes are usually considered as being infection or exhaustion. The subject is dismissed with a few words in all the textbooks. There is no way to study this condition in a manner that might throw light upon it, because it has never been carefully considered by either the obstetrician or psychiatrist.

In order to find the number of cases which accompany pregnancy, or follow it during the puerperium, so far as the records in hospitals for the insane are concerned one must study every history of all female patients admitted throughout the year. Often one finds only a brief reference, stating that the insanity began in the ninth month of pregnancy or, in other instances, on the second day after delivery, etc., etc. There is no effort made, in taking the history, to find out what the condition of the patient has been for days and weeks before the onset of grave mental symptoms; nor is there any concern as to what the physical condition of the patient was during the course of her pregnancy. No note is made of the presence or absence of vomiting, swelling of the face or extremities, in short, of any of the signs of toxemia which, in many instances, undoubtedly have much to do with the cause of the mental symptoms.

The study of a number of patients who have developed mental symptoms during the course of pregnancy, has brought these facts to the attention of the writer and suggests the necessity for greater care in the analysis of these patients, and a keener appreciation of

the principal factors which enter into the etiology, not only on the part of the obstetrician, but the psychiatrist as well.

It is only a clear understanding of the etiological factors that will lead to the proper treatment of these women at a time when serious harm may be prevented. The treatment at present, so far as the psychiatrist is concerned is quite similar to the treatment of malignant disease in the last stage. Usually, the psychiatrist does not see the patients until an acute psychosis has developed with all its horrors. Careful study of the histories of these patients will show that for days and weeks there have been many symptoms indicating the danger of approaching mental disorders, the severity of which cannot be known, or measured, even after the terrible explosion has occurred.

The responsibility of recognizing the danger and the early symptoms rests with the obstetrician; but it is the duty of the psychiatrist to teach the obstetrician how to recognize these conditions during the early stage, and how to treat these women in an intelligent manner in order to prevent the onset of more serious symptoms.

In the study of mental disorders it is necessary to develop the same keen appreciation of the signs that lead to early diagnosis as in all other forms of disease. It is just as true here as elsewhere, that the best and most successful treatment is that which is instituted early, before hopeless and irreparable harm results. We are, perhaps, too prone to look upon these poor subjects as hopeless objects of fate, when seen after the development of a psychosis accompanied by its various states of mental impairment. More attention should be given to the actual cause which precipitates the attack, and to the early symptoms which often exist long before the final collapse. It is true that many of these subjects are of low mentality and, perhaps, doomed even before the time of their birth; but there are women of high mentality, who suffer severe effects from the stress of pregnancy who, if neglected, run a serious risk. The effects range all the way from a simple nervous exhaustion to a permanent mental impairment. One of the most difficult things in medicine is to measure the mental stability of individuals.

The psychoses, which accompany fever and infection, may be said to be good measures of mental stability. Some persons may remain mentally clear with a temperature of 105; others will become widely delirious with a much less rise in temperature. We have all witnessed patients passing through an illness caused by an acute infection, such as typhoid fever or pneumonia, with no delirium; while in other instances delirium is an early and constant symptom

throughout the course of the disease. This is equally true of the pregnant state, and while in the vast majority of cases no such complication occurs, yet, in a certain percentage of cases, there are from the beginning many disturbances of the nervous system. The important fact to be borne in mind is that the mental stability of some women is low; and that stress of any kind, whether it be due to exhaustion, toxemia or loss of blood, will cause a serious derangement the degree of which depends upon her resistance or the intelligent treatment administered early in the case.

Many women suffer from mild symptoms such as irritability, fits of melancholy, etc., which arouse no particular anxiety on the part of the attending physician. If there is sufficient control present, the patient finally pulls herself together and perhaps escapes more serious disturbances. If the mental equilibrium is less stable, a psychosis may result. She seldom obtains much sympathy from her friends and little good from her obstetrician. The latter may not have a keen realization of the exact state of the patient's condition, and does not appreciate how much stress of this kind she can bear before giving way under the strain. After the onset of hallucinations and delusions, the diagnosis is easy, but the method of repair is a far more difficult procedure.

The obstetrician is not interested in the form of psychosis that is, whether the patient sees strange faces, or imagines a man under the bed; but he is concerned with the cause of such conditions, and how it can be recognized and best treated at a time when there is some chance of preventing the development of changes which may confine a woman to the insane asylum for the balance of life. It is well known that many women recover from insanity complicating pregnancy or the puerperium.

It is extremely interesting to note the number of women confined to hospitals for the insane for the second and third attack, all apparently similar in nature. It is very sad to follow the history of some of these cases during two or three attacks in consecutive labors with recovery. Pregnancy again occurs, the patient enters the hospital where she remains for weeks or months, and is finally tabulated by the attending physician as a hopeless case of insanity. This is simply the "pitcher going to the well once too often." The study of these histories lead one to believe, beyond question, that if some of these women had been properly treated during their pregnancy, they might have escaped a life of hopelessness and terror in a hospital for the insane. There was no consideration on the part of the obstetrician as to the great responsibility

placed upon him in the care of such a patient throughout the pregnancy. If the patient can withstand the storm, if her resistance proved equal to the task, all well and good. If not, the physician felt no blame or responsibility.

What are the essential causes in the psychosis complicating the pregnant or puerperal state? A predisposition, which means mental instability, to which is added the burdens that every pregnant woman must assume, toxemia, exhaustion or infection, is always an ill omen. Infection, or exhaustion from shock or loss of blood, often precipitate the attack during the puerperium, and it is well recognized that they are most important factors. But, in the opinion of the writer, there is need for more careful observation of these patients during the pregnancy in order to learn if there is not a period preceding delivery when the patient is suffering from the strain of pregnancy. There are certain women who become extremely nervous without any of the ordinary symptoms of toxemia, who, if carefully observed, will show occasional symptoms, viz: slight amount of albumin in the urine, etc. One fact is surely established and that is, that sufficient absorption of toxins may occur to affect the nerve centers in some women during pregnancy without any of the well-recognized pathognomonic signs of toxemia. The only explanation to be offered is that there is extreme susceptibility present. Until a keener interest is shown, data on the proportion of women having undoubted signs of toxemia, previous to mental disturbances, will be of little value. My own observation shows that in quite a large per cent. of the cases there have been persistent vomiting in the early months and later swelling of the extremities and albumin in the urine. It is with the proper conception of this stress of pregnancy, which is shown only by mild symptoms if any, that may lead the way to early recognition and better treatment.

Just as we have improved in our knowledge in the treatment of eclampsia by the recognition of the early signs, so must we realize that serious disturbances of the nervous system may be caused by a toxemia which is not sufficiently severe to produce the usual clinical symptoms. The continuation of this irritation for weeks without proper aid and treatment paves the way for the final collapse when the insult of delivery is added. After prolonged irritation from this source the shock, incident to delivery or loss of blood, may be the final blow which leads to mental collapse.

Treatment.—The treatment should be directed toward prevention, and it is only through a better understanding of the causes of this

complication that any advance can be made. The responsibility largely rests upon the family physician and the obstetrician. The first step is to remember the possibility of this complication in a woman having an unstable mental organization. If this is kept in mind, much is already accomplished. We cannot hope to anticipate the development of an attack of puerperal insanity in every instance; but the family history, careful study of the previous history of the patient, will often give a clue which should lead to cautious treatment. Careful observation and treatment may lead to results just as valuable in preventing nervous disturbances not accompanied by loss of reason. In all women who manifest unusual nervous symptoms during pregnancy, rest, absolute rest, is the treatment "par excellence." This is indicated in the presence of so-called hyperthyroidism especially. Elimination should be kept at the highest possible standard throughout pregnancy. If a patient gives a history of previous attacks either during pregnancy, or at other times, the advisability of a continuation of the pregnancy must depend upon the severity of symptoms during the attack and the general condition of the patient at the time. If there has been one severe attack, the patient should not be allowed to become pregnant the second time. If this unfortunate circumstance occurs, I believe the uterus should be emptied as soon as any sign of extreme nervousness begins which does not respond to elimination and absolute rest. It will not often be necessary, but it offers one of the best indications for the termination of pregnancy. A woman having had one severe attack with recovery should have the privilege of sterilization by the removal of the Fallopian tubes. In the milder forms, where the symptoms have not been severe, careful treatment will prevent the development of more serious conditions.

SURGICAL SHOCK AS A FACTOR IN OBSTETRICAL OPERATIONS.

BY

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IN the practice of obstetrics the physician faces many problems both medical and surgical. We realize that while the process is physiological, there normally being a wide margin of safety, many burdens are added to the maternal organism. Obstetricians to-day keep their patients under careful supervision during pregnancy

to see that a normal metabolic equilibrium is maintained, studying their cases to determine signs of overstrain. Semmelweis and O. W. Holmes taught the contagiousness of puerperal sepsis long before surgeons recognized the true nature of postoperative fever. Thanks to the surgeon, however, we admit the necessity of conducting obstetrical procedures under aseptic conditions. Nevertheless men whose surgical technic is beyond reproach undertake major obstetric operations when asepsis is not even to be hoped for. We still labor under the delusion that the pregnant woman is protected by some beneficent providence from the accidents and complications which threaten her sister in the surgical ward.

Following obstetric operations or even moderately severe labor we sometimes face a condition closely resembling that described by clinicians as surgical shock, and that in the absence of severe hemorrhage, rupture of the uterus or any gross lesion sufficient to explain the symptoms. Williams (*Text-book of Obstetrics*) cites an instance of collapse which he attributes to a preconceived idea of impending death, psychic stimulation. De Lee (*Obstetrics*), under the heading of Syncope and Sudden Death, considers shock a nervous reaction in susceptible women due to unusual straining, traction on uterine ligaments by forced delivery, peritoneal stimulation. Berkeley and Bonney (*Difficulties and Emergencies of Obstetrical Practice*), under sudden death following delivery, describe a condition of shock caused by the rapid emptying of the uterus and unconnected with any other condition likely to cause such an event. They mention three personal cases following forceps delivery in which there was no abnormal hemorrhage, rupture of the uterus was eliminated, pregnancy, heart and urine normal. One recovered after several hours, and two died, one with absolutely negative autopsy findings.

The following three cases illustrate the condition:

CASE I.—Primipara of twenty-seven, normal pregnancy, strong healthy woman, slightly contracted pelvis. Dilatation and version following preliminary packing of the cervix, lacerations repaired with no undue hemorrhage, good reaction. Was called about eight hours later, found patient restless, nervous and apprehensive, pulse 130 and at times irregular, no evidence of hemorrhage. Patient was assured that everything was all right, given hot tea and morphine hypodermically, gradually quieted and went to sleep and in a few hours was in good condition.

CASE II.—Primipara, eighteen years, manual dilatation with cervical incisions and forceps delivery for toxemia, repairs made and hemorrhage controlled, the entire operation requiring about an hour. Soon afterward patient began to complain of pain and faintness, was

restless, excited and apprehensive, pulse went to 140 and finally neither radial pulse could be detected by myself or colleague who assisted. Uterus firmly contracted and no evidence of hemorrhage. The condition was most alarming and we agreed that unless it could be controlled our patient would die. She was conscious, extremely restless, eyes glassy, pupils dilated, not reacting to light. Foot of the bed elevated, hot bottles applied to feet and limbs, hypodermics of ergotoxin, morphine and atropin given, saline and hot coffee per rectum. Patient quieted and dozed, pulse became perceptible at the wrist and gradually stronger so after some hours we felt the danger fairly passed. The exact history of a third case is not as familiar to me.

CASE III.—A primipara of thirty-five years, following a rapid dilatation and forceps delivery, went into collapse and died within a few hours, there being no evidence of hemorrhage or rupture of the uterus.

To properly appreciate the condition under discussion we must consider in some detail the physiology of surgical shock and its rational treatment. W. W. Keen and Weir Mitchell in 1864 advanced the idea that shock is due to vasomotor exhaustion. G. W. Crile (Cartwright Prize Essay in 1897) demonstrated experimentally the etiological factors and pathological physiology involved. That work together with subsequent experimental and clinical observation have presented a new conception of shock. The publications of Crile, Howell, Meltzer and Bloodgood are easily accessible but are not sufficiently appreciated by surgeons and obstetricians. It may be assumed that shock represents a loss of vasomotor control, by which the blood collects in the capillaries and venous spaces, so the vital centers literally suffer from anemia. As a result there is a marked fall in blood pressure, this being about the only positive clinical evidence which we have of the impending approach of shock. To overcome this and supply the anemic centers the heart beats more rapidly, becomes weaker and eventually fatigues. The primary lesion is disturbance in vasomotor control and all else is secondary. Howell (Contributions to Medical Research, dedicated to V. C. Vaughn, 1903) considers shock due to inhibition of the medullary centers from continued, repeated, or unusual afferent stimuli. It has long been accepted that such stimuli (vagal) may cause inhibition of cardiac centers, and the same being true of the vasomotor centers, possibly representing collapse. It is a question if such inhibition is long continued as in shock. Meltzer (*Archiv. Int. Med.*, July 15, 1908) distinguishes: (1) Physiologic shock, temporary suspension of vital reflexes after injury, not progressive and of short duration; (2) surgical or traumatic shock, vasomotor

center depressed, progressive but not necessarily fatal. Crile teaches that the vasomotor centers are exhausted by strong or unusual afferent stimuli. Grinnigen (*Prog. Med.*, 1908) believes that all medullary centers are primarily affected not by paralysis but exhaustion due to overstimulation. Crile distinguishes shock and collapse somewhat as follows: The onset is sudden in collapse, all centers functionally depressed but respond to stimulation, while in shock the onset is gradual, though only the climax is recognized, the vasomotor center in particular is exhausted and does not respond to stimulation.

Causes and etiological factors are: 1. Hemorrhage; 2. anesthesia; 3. afferent stimuli to the centers.

1. *Hemorrhage*.—Bloodgood (*Progressive Medicine*, 1899) states that shock is seldom observed in nontraumatic surgery when one absolutely prevents loss of blood. Control of hemorrhage is the most important indication in treatment of emergency cases. Crile in his original essay lays stress on the effect of hemorrhage and in his conclusions states that to avoid shock one must prevent even the slightest loss of blood. All agree that severe hemorrhage is an important causal factor but few would now attach as great significance to the loss of small amounts. However, it is difficult to estimate the loss of blood at labor or the amount which any individual will stand to lose. Moreover, the physiology of shock being essentially that of hemorrhage, the sudden loss of a considerable amount of blood may give rise to circulatory disturbances, fall in blood pressure, in this way becoming an important etiological factor.

From experimental work and clinical observations importance is attached to long-continued anesthesia. Crile, for example, found that perfectly healthy dogs died in shock after prolonged carefully given anesthesia. Chloroform is believed to be more dangerous than ether. Irregular narcosis, allowing the patient to become conscious at intervals is accepted as particularly dangerous. The ordinary use of chloroform during the second stage of labor corresponds to the type used by experimenters.

Afferent stimuli affecting the vasomotor center may be grouped as I, peripheral; II, cerebral. In the earlier work on shock stress was largely laid on the effect of peripheral stimuli, unusual painful sensations which reach the centers even under general narcosis. The value of blocking afferent nerves by injections of cocaine is well established. Schieffer (*Deutsche Zeitschrift f. Chirurgie*, 1905, Bd. lxxxv, p. 581), experimenting with the effects of gunshot wounds, found that dogs shot with shot at 30 to 40 meters fell at once and did

not rise; that is, the effect was out of proportion to the injury. When the dogs were anesthetized with Bier's method of spinal injection of cocaine no symptoms were shown till the effect of hemorrhage became evident, showing the independent result of pain. Gay and Parsons (*British Medical Jour.*, Apr. 7, 1912) show that every sensory nerve contains pressor and depressor fibers. At first stimulation of the central end affects the pressor fibers, stimulates the vasomotor center, and causes a rise in blood pressure. Persistent stimulation of the nerve fatigues the pressor fibers and actively stimulates the depressor fibers, causing fall in blood pressure and beginning shock. Struggling and excitement of anesthesia may be sufficient to produce the first stage and should be avoided, for if continued the condition goes on to the depressor stage. It has long been known that while primary stimulation of afferent nerves causes acceleration of medullary centers, continued or severe stimulation has a depressor effect. Whether this is passive fatigue or active inhibition is not clear. Physiologists prefer to speak of it as inhibition, but it is accepted clinically as fatigue from overstimulation. Also the effect may be cumulative or even delayed. The deleterious effect of such afferent stimuli on the central nervous system has long been accepted in the absence of absolute proof. Crile and Dolley (*Annals of Surgery*, 1910, vol. li, p. 753, *Jour. Med. Research*, April, 1909, vol. xxxi, p. 275) establish experimentally an anatomical picture of the pathology of shock, and describe changes in the Purkinje cells of the cerebellum which they ascribe to shock alone, believing that it is possible to estimate the degree of shock by the character of cell changes. These could be produced by the various conditions which are accepted as causing shock. Most important is the fact that the complete clinical and anatomical picture could be experimentally obtained by emotional stimuli, fright, excitement, etc. Cerebral stimuli of various types is recognized as a factor in producing shock. A. Kuzunski (*Medizinische Klinik*, Mar. 7, 1908, vol. v, p. 10) considers emotional shock as a postoperative danger and urges that fear and analogous emotions be overcome by proper psychotherapy.

Consider now a severe labor or obstetrical operation and the extent to which one or more of the above-mentioned factors are present. Always hemorrhage, usually easily controlled. Anesthesia, too often chloroform, and that over a period of some hours. Ether is safer in obstetrics as in surgery and fully as efficient. However both are used with an indifference which would be countenanced by no thoughtful surgeon. Afferent stimuli, usually neglected since considered normal. Few injuries or operative manipulations produce more

active or painful stimulation. When this reaches a point where the patient is exhausted we deepen the narcosis and deliver surgically. Here, however, afferent stimuli still reach the centers from the trauma of operative delivery, massage of the uterus, after-contractions, pain from lacerations, stretching of pelvic joints and bruised tissues. This is all accepted as normal but is sufficient to upset the center of some patients. Then we have psychical factors which vary with the individuals. I do not wish to overestimate the significance of such conditions, but there are women of a temperament unable to stand even moderate pain and upset, and cases where these factors are exaggerated (Reynolds, *Civilization and Maternity*, *Am. Jour. Med. Sciences*, Oct., 1908).

The prompt recognition and proper treatment of shock is most important, and one must eliminate embolism, rupture of the uterus, and hemorrhage. Embolism, especially of the lung, is discussed by Davis (*Surgery, Gyn. and Obstetrics*, July, 1905). Its diagnosis is difficult but the clinical picture is rather different from that of shock. Rupture of the uterus occurs before or during delivery and should not escape notice till afterward. It is associated with pain and signs of peritoneal irritation. Hemorrhage is more confusing since the physiological effect is much the same as shock. The presence of a firmly contracted uterus and the absence of external bleeding is sufficient to exclude progressive hemorrhage. When severe it must be controlled by the simplest appropriate means followed by proper measures to avoid shock.

Though most serious obstetrical work is in a sense emergency, we can do much in the way of prophylaxis. Study our patients according to Reynolds (*Am. Jour. Sciences*, Oct., 1908; *Transactions Am. Gyn. Assn.*, 1907). Use every means to quiet fear and give reassurance. Do not allow hysterical friends to upset the patient, and avoid elaborate explanations, though inspire her with confidence of a successful outcome. An appreciation of psychical factors which may have a bad influence will materially assist the physician to avoid trouble. Prevent confusion and undue excitement, make preparations for operation out of her sight. While first-stage pains are normal and to be desired, they may, especially in a primipara, upset the nervous system, prevent rest for hours or days and leave the woman in poor condition to go through a reasonable test of second-stage labor. A hypodermic of morphine, or 15 grains of chloral hydrate per rectum will secure several hours of needed rest while the contractions are fully as efficient. Furthermore, it will permit one to delay the use of an anesthetic till the second stage. Then administer it carefully

to allow the woman to use her pains efficiently and the physician to properly control delivery. While the indiscriminate application of forceps is not advocated, their judicious use is preferable to waiting for complete exhaustion with no progress. Any operative procedure is to be carefully planned and executed on surgical principles. Hemorrhage controlled with as little manipulation as possible, when in doubt give ergot in some form hypodermically. If severe, normal salt solution should be used as indicated in other conditions. Next make patient comfortable and conserve heat with as little excitement or fussing as is consistent with safety. If labor has been severe or suffering is extreme, morphine with atropine hypodermically will secure rest and repose and do no harm.

The onset of shock in most cases is gradual, though is often not recognized till well advanced and apparently is so sudden as to suggest collapse. If studied from the beginning, the patient is evidently very tired and exhausted, complains of pain, is restless, apprehensive and short of breath. While in no one particular is the condition alarming, the general effect is most startling. Pulse rapid, gradually becomes faint and irregular. One is most suspicious of hemorrhage but the uterus is firmly contracted and there is no evidence of bleeding. The condition rapidly becomes worse, pulse later fails, heart rapid, faint and irregular, consciousness is gradually lost, pupils dilated, and respiration fails. As a rule every effort is made to *stimulate* and with it all the patient dies. Sometimes, however, in spite of all that is done to stimulate, she is quieted and gradually recovers.

For proper treatment we have certain definite indications based upon pathological physiology: I. Avoid further stimulation of the already exhausted centers or possibly centers which any afferent stimuli actively depress. II. Support the circulation till the centers have recovered their normal equilibrium. They are overstimulated and their irritability is increased, evidenced by the restless condition of the patient. Further stimuli either peripheral or cerebral make the condition worse by whipping fatigued centers or cause an active fall in blood pressure by depressor effect. One drug, strychnin, the use of which is almost classical, is absolutely contraindicated in this condition. Its sole effect is to increase the irritability of spinal and medullary centers and to exaggerate all afferent stimuli. It is impossible to block nerve trunks as in surgery. The one thing needed is rest to the centers and relief from all stimuli. This can be secured with morphine, which should be the first thought. Its combination with atropine may be of value in supporting the circula-

tion, but morphine in dosage to overcome the effect of continued painful stimuli or harmful cerebral irritation is urgently indicated.

III. The circulation must be supported to supply the cerebral and medullary centers and restore them to normal function. Heat externally, elevation of the foot of the bed, and bandaging the extremities with cotton and wide flannel. This will force the blood into the body and increase the cerebral blood supply. It has much the same effect as the Crile pneumatic suit by which the surgeon is able to maintain the arterial blood pressure at any desired point during cranial operations. Normal salt solution is most valuable in raising blood pressure mechanically. It may be used in one of three forms, depending on the urgency of the condition and the apparatus at hand:

1. Proctoclysis, rather slow and may not be retained, but supplies the fluid without pain or excitement and can always be arranged.

2. Hypodermoclysis, more certain and efficient but may be painful.

3. Intravenously, requires more apparatus but is much more rapid in its effect. Bloodgood urges that no surgeon should be without his infusion set for emergency. A few cases are quoted by Bernheim (*Surgery of the Vascular System*) where transfusion of blood was done in case of extreme hemorrhage.

Drugs.—Ergot in some form is indicated to control uterine contraction and also helps to raise blood pressure by peripheral vasoconstriction. To be of any value it must be given hypodermically. Adrenalin is advised by many and is given in doses of 15 minims of a standard solution in 1000 c.c. of salt solution, to be repeated, as the effect is transitory. Caffeine and coffee are questioned, but the immediate effect of coffee is usually good, it is easily obtainable, and as it later causes diuresis is of value. Digitalis, doubtful, but probably too slow even when given hypodermically. What is needed is some drug which will act promptly and specifically on the peripheral arterioles, raise the blood pressure and slow the heart. On purely theoretical grounds Bloodgood (*Prog. Med.*, 1912) suggests the use of strophanthin in doses of 1 mg. intravenously.

In conclusion, these cases must be intelligently treated from the outset and can be satisfactorily controlled by rest, morphine, external heat, ergot, salines and hot coffee. Further stimulation and drugs which increase the irritability of the centers is a push downhill. Help nature to control the centers and support the circulation while this is being accomplished. Treat obstetrics as a true branch of surgery and apply surgical teaching, remembering that some women

are more easily affected by pain and psychical stimuli, a fact which must be taken seriously to successfully care for such patients.

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REFERENCES.

- G. W. Crile. Cartwright Prize Essay, 1897.
 Crile and Dolley. *Jour. Exptl. Med.*, vol. viii, p. 714.
 G. W. Crile. *Boston Med. and Surg. Jour.*, 1908.
 Crile and Dolley. *Ann. of Surgery*, 1910; *Jour. Exptl. Med.*, Nov., 1908.
 Crile. *Anoci-Association Jour.*, A. M. A., 1912, vol. lix.
 G. W. Crile. *Ann. of Surgery*, 1910, vol. li, p. 753.
 Wood and Clark. *Jour. Exptl. Med.*, 1897.
 Dolley. *Jour. A. M. A.*, May 1, 1909.
 Dolley. *Jour. Med. Research*, April 19, 1909.
 Howell. Contributions to Medical Research dedicated to Dr. V. C. Vaughan, 1903.
 Meltzer. *Archiv-Int. Med.*, July 15, 1908.
 Seelig and Lyon. *Jour. A. M. A.*, Jan. 2, 1909.
 Henderson. *Am. Jour. Physiology*, Feb. and April, 1909.
 Gay and Parsons. *British Med. Jour.*, April 27, 1912.
 Mummery and Synies. *British Medical Jour.*, Sept. 9, 1908.
 Allport. *Surg. Gyn. and Obst.*, April, 1909.
 J. B. Blake. *Ann. of Surgery*, 1909.
 A. Kuzinski. *Medizinische Klinick*, Mar. 7, 1909.
 Schieffer. *Deutsche Zeitschrift Chirurgie*, 1905, Bd. lxxvi.
 Davis. *Surg. Gyn. and Obst.*, Sept., 1905.
Progressive Med., Dec., 1899, 1900, 1905, 1907, 1908, 1909, 1911, 1912.
 E. Boise. *AMER. JOUR. OBST.*, 1907.
 Berheim. *Surgery Vascular System*.
 Williams. *Obstetrics*, D. Appleton.
 Berkley and Bonney. *Difficulties and Emergencies of Obstetrical Practice*.
 DeLee. *Obstetrics*.

THE IDEAL OBSTETRIC OUT-PATIENT CLINIC.*

BY

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In considering the subject that has been assigned to me for discussion, "The Ideal Obstetric Out-patient Clinic," I have tried to formulate a general scheme which, with modifications to suit local conditions, can be fitted to the needs of any community. It is impossible, in my opinion, to elaborate a plan which is suited to all

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communities in minor details, owing to the varying conditions existent in the different communities, and, therefore, all that I have tried to do is to formulate a general outline which is susceptible of modification according to the needs of the community in which the out-patient clinic is to be established.

For an out-patient obstetric clinic to be of value and therefore successful in any community, it is necessary that there be a recognized need in the community for such a clinic. In other words there must be a considerable population in that community whose circumstances are such that they require free or practically free medical attendance, and who receive inadequate care from the physicians who practise among them, a condition which exists in practically all of our large centers of population where the immigrant population tends to congregate. The number of these patients must be so considerable that the experience gained from their care will compensate for the time and money spent on them, as otherwise the care that they will receive will be perfunctory and they will be little, if any, better off than if no opportunity for dispensary care were afforded them, and one of the principal objects of such a clinic is to provide as good care for the poor as the well-to-do can command.

The second element necessary to the foundation of such a clinic is a constant supply of students or young physicians to whom the valuable experience gained from the care of these patients is sufficient compensation and who are able to devote themselves entirely to the work of the clinic when they are assigned to duty.

These two factors render it necessary that the ideal out-patient clinic should be founded in a city of at least moderate size in which there exists a considerable laboring class, and preferably a city in which a medical school exists from which students can be drawn to care for the patients under the auspices of the clinic, or failing a medical school, a considerable number of young physicians who are both willing and able to undertake the care of the unpaid obstetric cases on the same basis that they would accept a well-to-do patient, in order to gain the experience which can only be obtained from the care of a number of patients. In charge of the clinic must be one or more well-trained obstetricians who shall oversee the work and who are qualified to assume the care of the major abnormalities, which are sure to arise among any considerable number of patients, and who have access to a surgically equipped hospital in which the more serious obstetrical complications can be adequately treated.

These then are the essentials for the ideal clinic, a large number of patients, a sufficient number of medical students or young phy-

sicians to carry on the routine work under the oversight of one or more well-trained obstetricians, and a well-equipped hospital in which the more serious cases can receive adequate care.

Abnormal obstetric cases are apt to receive relatively poor care at home, even among the well-to-do, and for the poor patient the hospital is an economic necessity if good results are to be obtained. In addition a corps of trained nurses to visit the patients in their homes, both during the pregnancy and after delivery, while not absolutely essential for the well-being of the patient, will markedly increase the efficiency of the clinic and raise the standard of the work done, since they will perform many duties which would otherwise divert the medical attendant from the medical care of the case and further act as a strong educational factor in teaching the patients first the importance of proper hygiene both during pregnancy and after delivery, and second how to approximate this ideal to the means at their command. In order to obtain the best results and to be of the greatest benefit to the community the obstetric clinic must aim first at giving its patients such care as will lead that portion of the population which has been in the habit of depending on midwives or poorly equipped physicians to place themselves in the care of the clinic, and in the second place to educate the community by showing results as to the importance of the proper care of pregnancy and labor, and thus raise the standard of obstetric practice in the whole community.

One of the difficulties in out-patient work arises from the fact that the patients who belong to the class in the community for whom the out-patient clinic is established, have never been educated to the importance of a proper supervision of pregnancy. Every lying-in hospital is handicapped in its work by the fact that most of the serious cases which it is called on to treat have had no care during pregnancy and the complications which have arisen are seen too late, often at a time when a bad result is inevitable, whereas if the patient had been under supervision early in pregnancy the complication would have been recognized early and the patient given such attention and advice as to at least favor, it not insure, a good result. It is perfectly natural that the lowest class in the community from whom most of the patients must be drawn does not recognize the importance of care during pregnancy when we see how few patients of the well-educated class really understand the importance of proper care during pregnancy and how comparatively few physicians have had sufficient obstetric training to appreciate the needs of their patients for unusual care before their complications become serious.

The trained obstetrician recognizes that the majority of the bad results could be avoided, if the patients were under intelligent supervision throughout pregnancy and for an out-patient clinic to be properly conducted such a provision must be made.

The work of the out-patient clinic can best be considered under three headings, first, the care of pregnancy, second, the care of labor, and third, after-care.

The Care of Pregnancy.—In order to give the patients proper care during pregnancy a clinic for the care and study of pregnancy must be established under the charge preferably of a lying-in hospital in which all patients who apply to the clinic for treatment shall be studied. One of the requirements which should be insisted on if a patient is to be cared for by the clinic is that every woman must report at the clinic at regular intervals, even though she may be perfectly well. In charge of this prenatal clinic should be one or more physicians who have had a good obstetric training and who are, therefore, in a position to recognize any obstetric abnormalities which may be present in a given case, and to make provision for whatever special care the patient requires either at her home or in the hospital according to the nature of the case.

At her first visit to the prenatal clinic each patient should be thoroughly examined and any abnormality noted, and her previous obstetric history, if any, should be taken. She should then be given such simple instructions in regard to the hygiene of pregnancy as her intelligence and conditions of life will allow her to carry out. We cannot expect the woman of the laboring class to be able to regulate her life as accurately as her more fortunate sister, but the essentials of the hygiene of pregnancy can be followed by any patient, and will be followed by the great majority if the instructions that she receives are clear and simple, and the reason for the care made clear to her. At the first visit the patient should be instructed to report at the clinic at certain stated intervals and to bring a specimen of urine with her for examination at each visit, and a careful record should be kept of the time when each patient is to report. During the intervals between these visits the patient should be visited at her home by a trained nurse who can modify the directions for hygiene given at the clinic to suit the conditions of the home, in regard to which the doctor is often ignorant, impress on the patient still further the importance of carrying out these directions, take the blood pressure, etc., and remind her that she is expected at the clinic at a certain date. If the patient does not report at the clinic as directed she should then be visited again by

the nurse or better by one of the physicians on duty in the clinic to ascertain whether she has any good and sufficient reason for not reporting at the clinic, and she should then be informed that unless she reports to the clinic as directed she must look elsewhere for care and that the clinic will only assume responsibility for her if she obeys directions and under no other conditions. If possible it might be well, although it is not essential, for each patient to be visited at home in the intervals between her visits at the clinic by one of the physicians attached to the clinic to supplement the observations of the trained nurse and to make sure that everything is as it should be. The results of the nurse's visit should be reported to the clinic and filed with the patient's record for future use.

A month or six weeks before delivery the patient should be thoroughly re-examined. The pelvis should be again measured and the relation between the size of the child and the pelvis accurately determined, and from this time on the patient should be seen either at the clinic or at her home by the nurse at least every ten days. Such a supervision of pregnancy must result in the discovery of many abnormalities early in their course and insure to the patient proper care at the time of delivery, and each patient should in addition be instructed to report promptly any abnormal symptoms which may arise between the visits of the nurse. The patient should be tabulated in the records of the clinic as being normal, doubtful, or abnormal, and such provision made as seems best, to transmit such information to the department of the out-patient clinic in charge of the labor, in such form, that, when the patient sends to the clinic for a doctor to care for the labor, a glance at her record will show whether she needs any special attention at the time of labor.

No definitely abnormal patient should be cared for in her home, and all patients who are found to present a definite abnormality, whether it consist of pelvic disproportion, toxemia of pregnancy, or merely a history of obstetric disasters in the past, should be cared for in the hospital, for the tenement house furnishes no adequate means for caring for obstetric abnormalities, whether operative or due to disease.

Only such patients should be placed in the doubtful class as those in whom no definite abnormality can be discovered, even after examination under anesthesia. Such cases for example are primiparæ, in whom at the end of pregnancy the fetal head remains high, but in whom a careful examination has failed to show any disproportion between the child and the pelvic canal or other recognizable

abnormality, and in whom it is felt that the onset of labor will be attended by a prompt descent of the head into the pelvis.

In my opinion, the ideal obstetric out-patient clinic should deal entirely with normal cases or those requiring simple operative procedures, and never attempt to care for serious cases except in emergencies, such as prolapse of the cord, in which immediate operation is necessary for the sake of the child and the time lost in moving the patient to the hospital might be a serious factor in the result.

If students are employed to perform the routine work they should be assigned to duty in the prenatal clinic where they would gain a very valuable experience in the care of pregnancy, a subject which at the present time is seldom provided for in our medical schools with the result that while the majority of men enter practice with a considerable knowledge of the methods of normal or operative labor, they have little or no experience in the care of pregnancy and the early recognition of possible abnormalities and do not realize its importance, a fact which accounts for the condition which we see in general practice that treatment of abnormalities and not prophylaxis is given the greatest attention, and that the care of pregnancy is largely neglected.

Care of Labor.—The care of labor should be assigned to another department of the out-patient clinic, but the relation between the two departments should be such that all records of the prenatal department should be immediately accessible, so that when a patient sends to the out-patient clinic for a doctor at the time of labor he shall go to the case with the full knowledge of the previous history of the patient just as does a physician in private practice, or at least he should know whether the patient is classed as normal or as a doubtful risk.

Under ideal conditions the actual care during labor and at the time of delivery should be under the charge of third or fourth year medical students, or failing these, of young graduates to whom the experience gained in the conduct of a large number of normal cases will prove of value. During their term of service at the clinic they should have no outside duties or calls and should remain ready to answer calls day and night. In a clinic of any size this work is very exacting and the term of service should be comparatively short, not over two weeks, in my opinion, at any one time, owing to the physical exhaustion which the work entails. The number of men assigned to the clinic at a given time must be regulated by two factors, first the number of patients under the charge of the

clinic and second the number of students who are obtainable to do the work.

In our own clinic where we care for some two thousand patients a year with a fairly wide geographical distribution we maintain two stations in different portions of the city and try to have four students on duty at each station under direct charge of an out-patient house officer who is a graduate of a general hospital before he comes to the Lying-in Hospital. One student goes off duty each Wednesday and Saturday and his place is filled by a fresh man so that in times of stress there are always one or two men who are physically able to bear the burden and allow the men who have been on duty longer chance for sleep, which is often needed.

When the patient applies to the hospital for care, her record should be inspected and a student assigned to the case. He should preferably make his first visit alone, since, in my opinion, if the student is accompanied by a house officer or by a member of the out-patient staff, the patient is apt to lose confidence in him, and even the presence of a trained nurse will tend to lessen the student's reliance on himself and, therefore, tend to make him less efficient. Each student on leaving the station should register the time and place of his call, and if after a reasonable interval, say three or four hours, he has not reported the conditions present, the house officer should then make a personal call and check up the findings of the student, give him such instructions as are necessary and direct him to report the progress of the case at a given time or the appearance of any abnormal symptoms as soon as discovered. Each student should be required to watch several deliveries in the hospital, if possible, before being assigned to duty, in order that he may have a standard set which he will try to attain in regard to the proper conduct of delivery. If no opportunity can be afforded in the hospital for such instruction it should be obligatory for each student to attend several cases, the more the better, as assistant to a student already on duty.

We also find it a great advantage to maintain an instructor attached to our clinic who endeavors to see each student with one or more of his early cases, and instruct him in the proper methods to follow in attending a case, but our endeavor is to give every student as much responsibility as is possible without detriment to the patient, in order to make him self-reliant and increase his efficiency, feeling that by the proper oversight before mentioned, we can safeguard the interests of the patient fully and yet give the student a chance to gain valuable experience on his own responsibility.

If every patient has been conscientiously supervised during her pregnancy and adequate provision is made so that no case of prolonged labor can exist without being seen by a competent obstetrician, the actual work of delivery can be left safely to the students under supervision without fear that the patient's interest will be jeopardized and the work of the out-patient clinic will be reduced, as it properly should be, to the care of normal labor or low forceps operations and the study of the convalescence of the patient. Of course an occasional emergency may arise, such as prolapse of the cord or premature separation of the placenta, which will call for an operation of greater magnitude than is ordinarily contemplated in the patient's home, but these emergencies will be few and the objects of the clinic, to afford adequate care for the parturient woman, and valuable experience for the student in charge of the case will be gained at a minimum of risk, since, as far as possible, all abnormal cases will be removed from the clinic and cared for in the hospital. Even though carefully supervised the students should be required to report progress on all patients who have been in labor more than four hours; all patients who have been in the second stage for two hours or over, whether making progress or not; all cases of antepartum or postpartum bleeding and all perineal lacerations, and provision should be made at the out-patient station so that any call which the students may send in can be answered promptly by the physician or house officer in charge of the work. Care should be taken to see that too great responsibility is not placed on the house officer, and a competent obstetrician who shall act as a consultant and assume charge of any serious cases which may arise at any time, should always be in charge of the clinic.

After-care.—The delivery having taken place and the patient being in good condition at the end of delivery the care of the convalescence becomes the next object to be considered. Each student should be required to visit each patient whom he has delivered at least twice a day for the first three days taking the patient's pulse and temperature, noting the character and amount of the lochial discharge, examining the baby's eyes and noting the establishment of lactation, etc. He should be required to register the results of each visit at the out-patient station so that his records may be examined at any time by the house officer or physician in charge. The patient should also receive daily visits from the trained nurse attached to the clinic, at least for the first five days, unless the patient's circumstances are such that she can provide a competent nurse for

herself, and the nurse should report immediately any abnormality which may have escaped the student's attention, and instruct the patient as far as possible in the care of herself and baby.

After the third day the student should visit the patient at least once a day for the next four days and at such intervals as may be necessary following that till the patient is discharged from the care of the clinic.

The house officer or physician in charge of the clinic should visit each patient on the third or fourth day after delivery for the purpose of checking up the student's work and seeing that his reports of the cases are accurate, and no patient should be discharged from the clinic till a complete examination has been made by the house officer, which should include a vaginal examination to ascertain the position of the uterus and the progress of involution, the condition of the cervix and healing of any perineal tears which may have occurred. The condition of the patient's breasts and the eyes and umbilicus of the infant should be investigated, and no patient should be discharged from the clinic who cannot be certified as obstetrically well, unless she is transferred to the hospital for further care or is discharged against advice owing to unwillingness to follow out the directions which had been given her.

If any abnormality is found at the final examination necessitating a subsequent operation the patient should be referred to an appropriate hospital. In other words for the work of an out-patient clinic to be properly done the pregnancy and labor and the convalescence of each individual patient should be followed as carefully as the most conscientious obstetrician would follow a patient in his private practice.

We all recognize that the care which the rank and file of patients get during pregnancy, labor and convalescence, even in fairly good practice is utterly inadequate to assure good results, and the aim of every out-patient clinic should be to give each patient as good care as she can receive from the most conscientious obstetrician and to impress on the minds of the students the importance of such care in the hope that the out-patient clinic will prove to be not only a blessing to the patient but a means of raising obstetrical practice from the low plane on which it is conducted by the average practitioner.

In good practice it is surprising how ignorant the average mother is in regard to the care and feeding of her infant, and in hospital practice this ignorance is naturally greater. Furthermore, the means of the working woman are often inadequate to provide proper

food for her baby if she is unable to nurse it satisfactorily. A close association between the obstetric clinic and pediatric clinic should therefore prove of great value, and the ideal out-patient obstetric clinic demands the establishment of an associated pediatric clinic to which every patient discharged can be referred, the mother being instructed in the proper care of her infant and proper food provided in case she is unable to nurse. Probably in no way can the mortality among infants be more reduced than by these two clinics working in harmony, the obstetric clinic providing for the care of the mother and child during pregnancy and labor while the pediatric clinic provides for the care of the child at the time when such care is most valuable and teaches the mother how to carry on the work afterward.

The objection may be raised that the expense entailed in the conduct of such an obstetric clinic is prohibitive, but our experience has been that the voluntary contributions of the patients who are grateful for the care they have received more than pays the running expenses of the clinic, although in the early years a deficit must be expected. The success of such a clinic depends on being able to prove to the patients that they will receive better care in the clinic than at the hands of midwives or of poorly equipped practitioners. If this is once demonstrated to the patients the growth of the clinic is assured.

CLINICAL ASPECTS OF RUPTURED TUBAL PREGNANCY.*

BY

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It is with considerable embarrassment that I have decided to present this subject before this society, since every member has probably had greater experience with it than I. I hope, however, that you will pardon me for discussing it before you on account of the unique features of this symptom-complex, and since a case occurred in my practice most typical in history but unusual in termination.

In tubal gestation the fertilized ovum is arrested in its passage from the ovary to the uterine canal, that is, in the Fallopian tube. It is unique in that it appears as an accident of the pregnant state and one that strikes seriously at the patient's life. It is of

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extraordinary interest more on account of its etiological and diagnostic features, which go to make up the clinical picture, rather than the points of curative treatment; although the management of such cases is paramount in importance.

As to the frequency of this accident the greatest change of opinion has come about among medical men chiefly through the perfection of surgical technic. For the same reason its chief interest ceases to be of pathologic import and comes to be decidedly practical and acute.

Before 1876 this condition was so rare that it was believed that men attached to large maternity and gynecological hospitals might never see a case. In 1883 Tait made the first attempt to treat this accident by surgical means, paving the way to the discovery that the condition was not extremely rare, but rather a common one; hence, we find records where in 1892 Schrench had reported a series of 610 cases contributed by several operators in five years time. Williams states that Kustner has operated upon 105 cases within five years. Referring to Noble, it is estimated that this condition is present in 3 to 4 per cent. of laparotomies done by him. It is evident then that tubal pregnancy is a rather frequent condition met by the general practitioner, obstetrician and gynecologist. It is frequent enough to be looked for constantly in hope of early recognition. Hirst says tubal pregnancy occurs once in 500 pregnancies. On the other hand, there is an extremely different ratio in the work of different operators. Quoting Hirst again, Winckel saw but sixteen cases in 22,000 births and Bandl in Vienna saw three cases in 60,000 births. It is estimated that an experienced specialist in a large city might see from three to fifteen cases annually.

Several varieties of tubal pregnancy are recognized, as infundibular, ampular, isthmian. Extrauterine pregnancy may appear in any portion of the tube, according to most authorities occurring most frequently in the ampulla. Bandler, however, shows that in his series of 148 cases only eighteen were ampular, the majority being isthmian.

The etiologic features present great interest and have been the source of great investigation and conjecture. Most surgeons and pathologists agree that three classes of causes are demonstrated by the cases in hand. They are as follows: Those due to mechanical interference with the passage of the ovum; those due to inflammatory processes in the tubes and pelvic peritoneum: those due to decidual reaction in the tubes.

Chief among the mechanical obstructions are: inflammatory

adhesions compressing the tubes, polypi and other tumors either in the tubes or in other organs making mechanical obstructions, displacement of the tube and ovary causing marked angulation of the lumen of the tube, blind pouches. Great significance is given the presence of these pouches by Williams and he has been able to demonstrate them in many cases. He states that he finds such cases with the fetal sacs entirely closed off and that the ovum had become attached by burrowing beneath the mucosa as in normal uterine pregnancy. He is borne out in this by Gilliam and Rheinstein. External migration of the ovum with consequent increase in size during the journey, thus preventing the passage through the opposite tube, is an ingenious explanation offered by Sippel.

Gonorrheal infection of the tubes seems to play a much larger part than other infections of the tube in this condition. As a matter of fact, it is estimated by Dührsen, Mandl, Petersen and others that such a history could be elicited in two-thirds of their cases. In such instances a follicular salpingitis is set up resulting in a great number of culs-de-sacs similar to the diverticula described as mechanical obstructions. On entering one of these sacs the fate of an ovum is obvious. Puerperal infection seems not to have such bearing on this condition as gonorrheal mischief. A great deal has been written upon the effect of destruction of the cilia, as the result of inflammation, as a cause of tubal pregnancy. This view is losing ground since cilia are often found in tubes containing sacs of ruptured ectopic pregnancies.

Most interesting experimentation has been done to determine the truth or fallacy of the theory of decidual formation. The belief was advanced that tubal pregnancy could only develop when a decidual membrane was present similar to that in the uterus. Evidences of decidual reaction are present in specimens of tubal gestation; yet it is often absent, never abundant and usually imperfectly developed and having only fetal characteristics. This variety of causation is believed to be the result of latent tendencies to degeneracy and reversion to the lower animals, hence its appearance in only a few doubtful cases.

The clinical picture of ruptured tubal pregnancy is usually decidedly startling. It is usually a correlation of several recognized facts, viz., a definite typical clinical history; a more or less certain diagnosis of pregnancy; the accident of rupture with its attendant characteristics. The patient usually presents the history of sterility or relative sterility. As a rule some years have elapsed since her last pregnancy occurred, but perfectly normal women

occasionally conceive in this way. Some history relating to tubo-ovarian conditions is usually obtainable, as pain or soreness in the iliac fossæ existing for a number of years previously. Since rupture takes place usually before the sixteenth week the common subjective symptoms of pregnancy may be present. The patient very likely considers herself pregnant, noting the usual symptoms as cessation of menses, gastrointestinal symptoms, bladder irritability and so forth. Cessation of menses is estimated to be present in 43 per cent. of cases. This low proportion is probably due to mistaking hemorrhage incident to fetal death for menstruation. The metrorrhagia, so-called spotting, and discharge of decidua from the uterus is looked upon as nearly pathognomonic evidence. It is not at all infrequent that such patients should complain of considerable pain in the tuboovarian regions before rupture takes place. It is unfortunate that until the onset of rupture there is no evidence of any irregularity, often not attracting the patient nor the physician. It is unusual that the diagnosis is made before rupture and then only when treatment is sought for something else at the hand of the most skilled specialist. With rupture, however, it is plainly different. The patient, previously well, is suddenly seized with pain of great severity. The pain is lancinating, paroxysmal and from its effect alone the patient sinks into profound shock. The pallor and claminess of body that immediately appear are evidences of the hemorrhage already in progress. Nothing is more characteristic than the calamity that comes with rupture. The previously well woman is seized at her work with unbearable pain, the hemorrhage blanches her, she falls fainting, going immediately into profound shock. Temperature is found subnormal, pulse rate high, often imperceptible. When the immediate shock is over and some little reaction is seen, great thirst appears with restlessness and anxious countenance. By pelvic examination the uterus is found softened, enlarged, but probably not to the size of a corresponding normal pregnancy. The uterus is usually displaced and moves with difficulty, giving great pain. A soft doughy mass is felt either in the culdesac or at the side of the uterus. Incision into the mass reveals clotted blood.

Considerable difficulty is often found in differentiating tubal pregnancy with rupture from abortion of normal pregnancy and again from acute appendicitis. The former condition is usually determined by the more quiet onset in abortion, with external hemorrhage in proportion to shock. Also by the demonstration of the

fetus within the uterus or expelled; while in extrauterine pregnancy the onset is stormy, the shock greatly out of proportion to the visible hemorrhage and decidua usually demonstrated in the empty uterus. A mass along side of the uterus is presumptive evidence of extrauterine in such instances.

From acute appendicitis the findings negative to pregnancy, the points just mentioned coupled with the usual leukocytosis of appendix trouble clear the diagnosis, particularly if there be fever, nausea and vomiting.

Extrauterine pregnancy with rupture terminates chiefly by tubal abortion or direct rupture of the tube into either the peritoneal cavity or into the broad ligament. By far the greatest proportion of cases terminate by tubal abortion. In this instance the product of conception perforates the capsular membrane, is dislodged into the tube eventually passing out through the fimbria with trickling of blood resulting in the formation of pelvic hematocele. The second variety of termination, direct rupture of the tube, occurs much less frequently. It is estimated by Hirst and Gilliam that it occurs in one-third of their cases. Rupture takes place when chorionic villi have so perfectly penetrated the muscular coat of the tube as to lie directly under the peritoneal coat. Several contributory causes of rupture are evident, namely, the pressure of the growing ovum and distention of the tube wall; separation of muscle and connective-tissue fibers by edematous infiltration, and the usually determining force which precipitates rupture, the effusion of blood either into the tube wall or ovum. In direct rupture the shock is more severe, the hemorrhage is likely to be much greater, pain is more severe and of more paroxysmal type, especially if rupture has occurred into the broad ligament. Perforation of the tube into the peritoneal cavity results in hematocele as in abortion, while hematoma is the resulting condition in broad ligament rupture. In either instance there is fetal death usually and yet it is possible for pregnancy to continue in the instance of imperfect separation of the fetal attachments.

The consideration of the elements relating to the cause and cure of this condition are paramount in importance. It is possible that prophylactic measures will reduce the frequency as well as the fatality of this calamity. Insistence upon measures directed toward complete recovery from pelvic infections is worthy of our attention. Removal of mechanical defects such as tumors, correction of displacement of organs and the repair of lacerations, since they bear upon the functional health of these organs, would seem to have direct bearing from a prophylactic standpoint. The closest observation of

patients thought to be or known to be pregnant will no doubt allow a larger proportion of positive diagnoses before rupture, especially if examination is insisted upon for any suspicious symptom present.

No controversy continues over the curative treatment of ruptured tubal pregnancy. The treatment in all cases is operative at the earliest convenient time. It is a general impression that extrauterine cases must be operated upon with great haste. It is certainly advisable to operate upon all cases as soon as suitable surroundings can be procured. The cases of doubtful diagnosis seem to prove that a few hours can be well spent in sustaining the patient until proper light, technic and assistance can be obtained. It is likely that several times during one's lifetime he will see cases that need immediate operation at home on account of approaching death, that is quite unusual however. A temporary reaction is nearly always seen after rupture. This may be enhanced by the use of salt solution, the rest from position and morphine in large doses and operation may then be done in a hospital during the daylight hours under nearly ideal surroundings. Whenever only relative doubt exists as to diagnosis, cases should be moved to hospitals; a desperate case is much safer in a hospital waiting an hour or so, to effect artificial stimulation, than a case of slow rupture or one without rupture to be moved in case of developments. Of paramount importance in such cases are two facts: immediate action, whether to operate or stimulate and care in manipulation such as in transportation, examination or preparation. To this, constant supervision may be added as highly important. The curiosity of the etiological and pathological features of ectopic pregnancy is great enough to give interest; its diagnostic exercise adds zest to those most skilled. A most delightful feature is the large proportion of perfect results, so far as the mothers are concerned.

Case Report.—The following case of ruptured tubal pregnancy is reported since its history seems so typical and its termination, rupture into the broad ligament, is rather rare. I am indebted to Dr. W. E. H. Krechting for the courtesy of allowing me to see this case.

Mrs. W. T. D., aged thirty-five, married, housewife.
Family and previous history unimportant.

Genital History.—Menstruation began at fourteen years. Always irregular in time, quantity, and duration, and always painful before and after periods. Last period thought to be February 18-25, 1913, but probably in December, 1912. Patient married in 1898; three pregnancies, one resulting in one full-term child in 1900. Two miscarriages since then, the second seven years ago (1906).

Present Illness.—On March 28 I saw this patient for the first time when she presented the following history. While at her work that day, apparently in good health, she had suddenly been seized with great pain in the right iliac fossa and had almost immediately become unconscious. Great pallor and claminess occurred immediately and pulse rate rose rapidly, becoming imperceptible. It was learned that there had been no menstrual flow in January, a profuse flow for seven days in February and that none had occurred in March. There had been nausea in the morning. Some slight breast and abdominal enlargement. For four weeks great pain was felt during defecation and there had been colicky pains in the right inguinal region. I was greatly impressed with the absence of pulse, pronounced shock and paroxysmal nature of the pain. Pelvic examination revealed a large hard mass filling the culdesac, but bearing off to the right. Mass moved slightly with cervix. Body of the uterus could not be made out.

Diagnosis of ruptured tubal pregnancy was made with the possibility of a cyst with torsion of the pedicle as second choice. She finally consented to go to the hospital, reaching there in worse shock if possible. It seemed urgent to stimulate her before operating. With salt solution under the skin and by bowel, her immediate improvement was so great as to warrant postponement of operation until the daytime, since it was then night. Such improvement had occurred the next morning, the pulse rate was 80 and of good volume. Leukocytes had been counted and reached 12,000. Hemoglobin, 50 per cent. Postponement was then risked until the next day. Stimulation and feeding being forced. On the next day, with patient in nearly ideal condition, operation was done. Some free blood was found in the peritoneal cavity, but an enormous collection confined within the right broad ligament. Right Fallopian tube seemed fused with broad ligament and its characteristics lost beyond the isthmic portion. Product of conception was found between layers of broad ligament with rudimentary placenta apparently attached there.

It seemed that possibly perforation had occurred at the February flooding, since it was accompanied with great pain, and that this second catastrophe was a secondary rupture. Although it is unusual to find rupture into the broad ligament I am confident that this was a true case of this variety.

DIPHTHERITIC VAGINITIS.

BY

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(With One Illustration.)

SINCE the discovery of the Klebs-Loeffler bacillus, so few cases of diphtheritic vaginitis have been reported in the literature that I feel justified in reporting this rather unique case. These cases of true diphtheritic vaginitis must, of course, be differentiated from those cases in which membranes are found which resemble the diphtheritic membrane but do not contain the Klebs-Loeffler bacillus. I was fortunate in obtaining from this case a cast, that was discharged *in toto* from the vagina. This cast is, as far as I have been able to ascertain, the only one that has been reported up to the present time.

CASE I.—A. H., female, was admitted to the medical ward of the Harlem Hospital, on the service of Dr. Richard Wiener, suffering from a lobar pneumonia, with its usual symptoms. About twelve days after admission, on examination of the chest, a flat percussion note was discovered, and aspiration of the chest cavity showed the presence of pus. The following day, a number of cases of diphtheria were discovered in the ward, and a culture from the throat of each patient was made. On examination of the throat of this patient, both tonsils showed the presence of a membrane, a culture of which proved to be on examination a case of true diphtheria. The other cases were removed to the Willard Parker Hospital, but because of the precarious condition of this patient it was feared that a long journey in the ambulance might prove fatal, so she was transferred to the isolation ward of this hospital. She received at once 10,000 units of the Board of Health's antitoxin. On the third day after her removal to the isolation ward, the nurse in attendance reported a foul-smelling discharge from the vagina of the patient, and upon examination the vulva and vagina were found to be covered with a dull grayish membrane. The vulva was red and edematous. A culture was taken from the vaginal membrane and Klebs-Loeffler bacilli were found. She was given another 10,000 units of antitoxin, and 10,000 more two days later. After the third injection, her temperature dropped, and she began to feel more comfortable. On the twelfth day after patient's removal to the isolation ward, the nurse, who had been giving her douches of lysol solution twice daily, showed me a membrane which had detached itself and had come

away with the vaginal douche. A picture of this membrane accompanies this article. After the discharge of the membrane, the vagina showed a red, raw surface, which was swollen and bled moderately for a few days, accompanied with a profuse creamy discharge. The flatness on the patient's chest changed to dullness, the lungs improved, and the breathing sounds became normal.



FIG. 1.—Decidual cast.

After three weeks she was transferred back to the medical ward. On the third day after her return to the ward, notwithstanding constant tonic treatment, she developed edema of the lungs and died. Unfortunately we could not obtain an autopsy.

At autopsy on women who have died of puerperal sepsis, we often see membranes in the uterus, cervix, and vaginal walls which remind us of diphtheritic endometritis and vaginitis. In fact many years ago, Waldeyer described a diphtheritic exudate of the uterus and demonstrated the presence of chains of round bacilli which we know to-day to be streptococci. I mention this merely to show the importance of a thorough bacteriological examination.

Bumm has also shown the difference between true and false membranes of the vagina. The true membranes are composed of fibrin which react characteristically to Weigert's stain. The false membranes are composed of necrotic tissue which show the outlines of the cells, but contain very little fibrin.

William Cuthbertson (*Jour. A. M. A.*, Sept. 19, 1908) reported a case of diphtheritic genital infection, simulating puerperal fever, and also reported a number of cases he had collected from the literature, some of which are very interesting and which I will repeat in detail.

E. Bumm (Ueber Diphtherie und Kindbettfieber, *Zeitschr. f. Geburtshilfe u. Gynaek.*, xxxii, 1895, p. 126), reports the case of a woman twenty-one years of age who developed symptoms of puerperal fever on the third day after the birth of twin children. Examination on the sixth day showed the labia minora to be edematous and lined on the inner surface with a diphtheritic membrane, which reached as far as the margin of the labia and was surrounded by a red areola. This membrane was peculiarly white and glistening, of somewhat irregular surface, and several millimeters thick. It was fairly solidly attached, and bleeding was caused by an attempted removal. The white lining was continued into the vulva, where it reached up to the swollen urethral orifice. The vulva and vagina were lined with a white mass, and the portio and cervix were covered with a white layer. There was a thin serous odorous discharge. The characteristic feature of the findings consisted in the glistening white color of the membranes, their continuous distribution over the entire surface of the genital tract, and the complete absence of any inflammatory phenonema in the surroundings of the uterus. Examination of the material from the walls of the cervix, the vagina, and the vulva, showed in the first place the absence of streptococci. The superficial layers of the membrane contained a large grayish-white nonpathogenic diplococcus; the deeper layers were found to contain the Klebs-Loeffler bacillus in very large numbers. Four injections of Hoechst serum, No. 2, were followed by recovery with uninterrupted desquamation of the membranes in the genital mucosa, notwithstanding a complicating diphtheria of the nasopharynx. Bumm points out that he believes this observation to be the first case in which the occurrence of genuine diphtheria in the genital tract of puerperal women has been positively established by the demonstration of the specific bacillus. Only such cases, he states, are entitled to the designation, "puerperal diphtheria." This term is applicable neither in the anatomical nor the etiological sense to streptococcus necrosis, which has been most frequently described under this heading in the past.

Treuthardt (Ein Fall von Diphtherie im Puerperium, *La Presse Medicale*, 1908, p. 75), reports the case of a patient, who had just been delivered of a full-term child, but who presented a rise in temperature. The whole condition was contraindicated of a septic process or ordinary puerperal fever. As diphtheria was preva-

lent in the district, Treuthardt assumed a diphtheritic process to be the cause of the trouble. Examination with the speculum showed the portio to be swollen and covered with grayish-white membrane, closely resembling those found on the tonsils in diphtheria. The case was treated with antitoxin, and the patient recovered.

Ungara (Puerperale Diphtherie im einem Falle von Placenta prævia centralis, *Rassegna*, No. 5, 1906, and *Centralblatt für Gynaekologie*, 1908, No. 3, p. 91) reports a case of puerperal diphtheria in a multipara who was delivered in the eighth month on account of a placenta previa and resulting hemorrhages. On the seventh day, fever appeared with severe general manifestations. On examination of the genitals, the mucosa was found to be covered with a white membrane, especially on the posterior wall. The bacteriological examination showed the presence of diphtheria bacilli. The outcome was favorable, after injections of serum. The infection in this case originated from the patient's three-year-old child which was suffering from diphtheria and had been cared for by the mother until her operation.

Orland (Diphtherie des puerperalen Uterus, *Allgem. Wiener, Med. Zeitung*, ii, 1906, No. 45) reports a case in a woman twenty-one years of age, from whom a macerated fetus was removed after decapitation, on account of neglected transverse presentation. One day after delivery, there occurred a constant rise of temperature, reaching its maximum on the sixth day. The vagina and uterine cavity were lined with grayish-white membranes. The bacteriological examination showed numerous diphtheria bacilli besides streptococci and staphylococci. On the sixth day, antistreptococcus serum was injected; and on the ninth day this was followed by injections of antidiphtheritic serum, after which the membranes promptly disappeared and the patient was free from fever on the eleventh day.

Freundt (Ueber Diphtheritis vaginæ und Osteomyelitis im Wochenbett, *Monatschr. f. Geburtsh. u. Gynaek.*, xxii, 1905, p. 553) reports three cases in the puerperal period, but not of puerperal origin:

CASE I.—Primipara, normal until third day, then a high fever appeared. On the fifth day, a layer was noted on the perineal wound. The fever subsided for two days after the removal of the sutures. The child meanwhile presented an infection of the umbilicus. The fever of the mother rose to 40° C. with chills. Bacteriological examination of the wound covering showed the presence of true Loeffler diphtheria bacilli and also some streptococci. The wound cleansed itself after the administration of Behring's serum.

The child died from diphtheria of the nose and throat. Soon afterward, the patient's mother and husband were likewise attacked by diphtheria, but recovered.

CASE II presented the picture of a puerperal infection. A tear of the vagina had been sutured with catgut. There was no fever until two days after the removal of the gut, when diphtheria bacilli were again demonstrable. Behring's serum was given, and the patient recovered.

Raw (Puerperal Septicemia, with Special Reference to the Value of Antistreptococcic Serum, *Jour. Obstet. and Gynecology*, v, 1904, p. 334) states that diphtheria is capable of producing a most malignant form of endometritis and septicemia, characterized by the formation of a dense diphtheritic membrane over the whole endometrium and cervix, and all the toxic symptoms of the disease. A most interesting example came under Raw's observation; a midwife who was suffering from diphtheria attended three women in confinement; they all developed puerperal fever; two of them coming under his care at the hospital, while the third one died at home. Both were operated on, and enormous masses of thick grayish diphtheritic membrane were scraped away, which on examination bacteriologically showed the presence of a pure culture of Klebs-Loeffler bacilli. One woman recovered, the other died.

Piassetzky Observation of Diphtheritic Fever in the Puerperium, with Demonstration of Klebs-Loeffler Bacillus and Recovery after Administration of Anti-diphtheritic Serum (*Jour. Prakt. Med.*, vii, 1900).

Favre (*Annal. Soc. Obstetr. de France*, 1899) observed a case of diphtheritic fever during the puerperium, terminating in recovery. The presence of Klebs-Loeffler bacillus was demonstrated.

Schroeder (Ueber Haut und Schleinhaut Diphtherie, Inaugural Dissertation, Greifswald, 1899) reports the following case of cutaneous diphtheria and vulvovaginitis treated in the Greifswald Medical Clinic, in the service of Dr. Mosler. The patient was a girl, ten years of age, who was admitted suffering from a wound of the left foot and a paronychia of the left thumb. The tonsils were red and swollen and presented a grayish-white membrane. The patient complained also of a burning pain on passing urine. On inspection, the clitoris, the labia majora and minora, and the vaginal mucous membrane were swollen, reddened, and covered with a grayish-white membrane. Upon examination, a pure culture of Klebs-Loeffler bacilli was demonstrated and found to be highly virulent in the experimental inoculation on guinea-pigs. The

treatment consisted in an injection of Behring's serum. Seven days after, the genitals presented normal findings.

Clark (Use of Antitoxin in Two Cases of Puerperal Sepsis, *Boston Medical and Surgical Journal*, No. 2, 1890, p. 27) reports the case of a multipara, who, after an easy labor, developed a rise of temperature on the day after delivery. Upon examination, the cervix was found to be covered with a thin membrane which extended into the cervical canal. There was a profuse and foul discharge. A culture taken from the vagina was found to contain the Klebs-Loeffler bacillus and streptococci. The patient recovered after an injection of antidiphtheritic and antistreptococcus serum. (Two of the mother's children had been suffering from sore throat, and cultures were found to be positive.)

J. Whitridge Williams (*AMER. JOUR. OBST.*, xxxviii, 1898, p. 180) reports a case of diphtheria of the vulva in which Klebs-Loeffler bacilli were demonstrated. The patient was a woman twenty years of age, who, on the fourteenth day of the puerperium, was obliged to seek advice for pain and swelling of the vulva. Diphtheritic infection was suspected on account of the death of two children from diphtheria during the week. On examination, the entire vulva was found to be red, hard, greatly swollen, and covered with a profuse dirty discharge. The membrane extended only a short distance up the vagina. The examination of the throat was negative. Klebs-Loeffler bacilli were found in the culture, and recovery followed the use of antitoxin.

Fremuth and Petruschky (Ein Fall von Vulvitis gangraenosa (Noma genitalium) mit Diphtheriebacillen Befund, *Deutsch. med. Wchschrft.*, No. 15, 1898) report a case in a girl three years of age, who, as a sequel after measles, began to suffer from severe hoarseness and noma of the genitals. As diphtheria bacilli were found in the necrotic portions of the vulva, diphtheria serum was administered and the patient recovered.

Fischer (Fall von gangraenosier Diphtherie der Vagina, *Münch. med. Wchschr.*, No. 42, 1902) reports a case in a child fifteen months of age, which had been under treatment for gonorrheal vulvovaginitis, and was admitted to the clinic for diphtheria of the vulva. Sudden death occurred at the end of three days, and the autopsy showed extensive gangrenous diphtheria of the vulva and vagina. The uterine mucosa was intact. Both tonsils presented small ulcers without deposit. Smears from the tonsils and vagina showed the presence of diphtheria bacilli. At the first examination of the vaginal pus, only gonococci were found. Thus a severe diphtheritic

infection of vulva and vagina had developed upon the soil of gonorrhea, as the result of a mild throat diphtheria which had caused no clinical symptoms.

Erikson (Fall af genom differi baciller foerorsakad Vulvovaginitis, *Hygiea*, June, 1903, p. 651) observed a case of vulvovaginitis due to diphtheria bacilli in a girl eight years of age. Other children in the family were suffering from diphtheria. The patient first complained of pain on urination which increased and finally rendered catheterization necessary. On the fourth day, the usual throat symptoms made their appearance. Diphtheria bacilli were obtained on pure culture. Gonococci were absent. The condition rapidly improved after the injection of diphtheritic serum.

Longyear (Puerperal Diphtheria, *AMER. JOUR. OBST.*, vol. iii, 1897) reports six cases in which the diagnosis of diphtheria was proved by cultures made from the genital tract and submitted to the bacteriologist of the Health Board of Detroit.

Haultain (Case of Puerperal Diphtheria, *The Lancet*, June, 26, 1897, p. 1745) reports a case of a primipara whose puerperium was normal for the first ten days, when intrauterine diphtheria gave rise to a series of complications. The diagnosis would have been impossible without the bacteriological findings. A discharge from the cervical canal gave a pure culture of Klebs-Loeffler bacillus. An injection of antidiphtheritic serum was followed by markedly beneficial results.

Cioffi (Un altro caso di guarigione di endometrite difterica di origine puerperale, curato col siero di Behring, *Gazzetta degli Ospedali e delle Cliniche*, No. 67, 1897, p. 714) observed a case of diphtheritic endometritis following immediately upon childbirth and extremely severe in character. Recovery took place after an injection of Behring's serum.

Jacobs (*Journal d' Anatomie*, Dec. 12, 1897) reports an observation on a case of diphtheritic infection in the puerperium, with demonstration of Klebs-Loeffler bacillus and recovery after injection of antitoxin.

Nisot (Puerperale Diphtherie-Serotherapie, *Central. f. Gynaek.*, No. 7, 1896, p. 191). This case of diphtheria of the vagina and uterus is also claimed to be the first case in which the Loeffler bacillus was recognized. The diagnosis of genuine diphtheria was made in view of the fact that the attending physician was treating several cases of pharyngeal diphtheria at the time of the confinement. The patient, a woman twenty-two years of age, developed temperature on the third day after the birth of a dead child. A

membrane which had become detached on the fourth day of the disease was examined and the presence of the diphtheria bacillus was demonstrated.

Brinkmann (Zwei Faelle von Scheidendiphtherie mit Behring'schem Heilserum behandelt, *Deutsch. Med. Wchschr.*, No. 24, 1896, p. 384) reports two cases of vaginal diphtheria treated with Behring's serum. The first patient was infected three days after childbirth from taking a little daughter, three years of age, into bed with her. This child had diphtheria of the throat. The second patient had diphtheria of the vagina from some unknown cause. Both patients recovered after the use of Behring's serum.

Fitzgerald (Diphtheria in the Puerperium, *Brit. Med. Jour.*, ii, 1895, p. 77) observed a case of diphtheritic infection, but without a demonstration of the Klebs-Loeffler bacillus.

Vucetic (Ein Fal von ausgedehnter Haut-diphtherie, *Allgemein. Wiener med. Zeit.*, No. 51, 1894, p. 575) reports a case in a girl five months of age who began to suffer from severe swelling and inflammation of the genitals and the throat on the day following the death of her older brother from diphtheria. The labia minora, the vestibule, and the urethral ridge were covered with a whitish membrane. Microscopical examination showed the Klebs-Loeffler bacillus.

Gayton (A Case of Paralysis following Diphtheria of the Genitals only, *The Lancet*, May 26, 1894). Among 2733 cases of diphtheria, observed during six years in the London Northwestern Fever Hospital, the author noted involvement of the genitals in only six cases. His personal observation concerned a girl six years of age with primary isolated membranous diphtheria of the vulva. About five weeks after admission, when the genitals were quite free from membranous exudation and presented a perfectly healthy appearance, the patient died from diphtheritic paralysis.

Lott (Diphtherie der Portio, *Centralb. f. Gynaek.*, No. 40, 1894, p. 982). This case concerned a peculiar change of the portio at its anterior lip in a pregnant woman who came under treatment on account of a profuse offensive discharge.

Biggs (*Proceedings of the New York Pathological Society*, 1893-94, p. 44, Diphtheritic Vaginitis), presented a specimen derived from patient who died in Bellevue Hospital with symptoms of alcoholic neuritis. Examination on the third day after admission showed the vagina to be the seat of an extensive diphtheritic inflammation. The patient was under observation for eleven days, but nothing abnormal was observed about the throat. At the autopsy

it was found that the lower part of the rectum was the seat of a recent diphtheritic inflammation.

Ferranti (Caso di difterite vulvare, *Il Raccoglitore Medico*, xiv, No. 12, 1892, p. 333) reports the case of a girl fifteen years old who had not passed urine for thirty-six hours on account of local pains. Examination showed edema of the labia majora and the presence of a membrane. Klebs-Loeffler bacilli were demonstrated. The case recovered.

Coldstream (Case of Diphtheria of the Vulva, *Brit. Med. Jour.*, May 9, 1891, p. 1016). The patient was a girl, twelve years of age, with genuine primary diphtheria of the vulva. The throat was carefully examined each day for four weeks, but no membrane was found. The patient recovered.

From a review of the reported cases, it is evident that a thorough bacteriological examination should be made of the secretions of the genitals of all female patients who are suffering from diphtheria or have a discharge of unknown origin. Should the presence of the Klebs-Loeffler bacillus be demonstrated, it is urgent that one single large dose of diphtheria antitoxin be at once injected.

136 WEST EIGHTY-SEVENTH STREET.

THE LATER OPERATIVE TECHNIC IN THE TREATMENT OF CANCER, WITH SPECIAL REFERENCE TO CANCER OF THE BREAST AND UTERUS.¹

BY

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NOTWITHSTANDING the earnest and well-directed efforts of so many and such able workers in this field, the true pathology of cancer is no more clear to us now than was that of tuberculosis before the discovery of the tubercle bacillus. The literature on this subject shows no such progress as does that on tuberculosis or syphilis, and, aside from such histological facts as have been established, leaves us nothing but observation and experience as our guide, both in the treatment and in the diagnosis of this disease.

In a recent paper before the American Gynecological Association, Hoffman presented the following statistics. "It is a safe estimate that in the United States the mortality from cancer is 75,000 and in the civilized world 500,000. There is an annual increase of cancer

¹ Read before the Twenty-sixth Annual Meeting of the American Association of Obstetricians and Gynecologists at Providence, Rhode Island, September 16-18, 1913.

deaths of 2.5 per cent. Ninety and seven-tenths per cent. were deaths at the age of forty or over. Cancer in the male, twenty-five years and over, had increased 29 per cent. during the last decade, and the female cancer deaths had increased 23 per cent. The cancer death rate of large American cities had increased from



FIG. 1.

37.2 per 100,000 population during the five years ending with 1876 to 80.5 during the five years ending with 1911".

It is probable that cancer is increasing. It is even possible that it is increasing in the alarming ratio shown by the foregoing statistical conclusions. We must consider, however, that our diagnoses are much more correct than they formerly were, and that many cases, such as catarrh of the stomach, catarrh of the bowels, liver

diseases, even malaria and many other conditions, are now correctly diagnosticated as cancer. It is probable that a statistical review of cancer since 1876 would not be much more reliable or convincing than would a statistical review of tuberculosis for the same period of time. With our present knowledge of the disease, our only hope in checking this alarming mortality is surgical intervention as early as a diagnosis can be made. So long as the cause of this disease remains unknown to us, so long as there is no physiological, or bacteriological, or diagnostic reaction or sign at our command whereby



FIG. 1A.

an early positive diagnosis can be made, so long will the full measure of our success in the treatment of this disease be deferred. With the full recognition, however, that cancer, as did tuberculosis formerly, comes to us with very few exceptions already in its advanced state, and with the recognition that cancer is highly infectious, much can be done to render statistics more hopeful. In other

words, a careful observance of the principles which should govern our technic in performing radical operations for cancer will do much toward making our results more satisfactory.

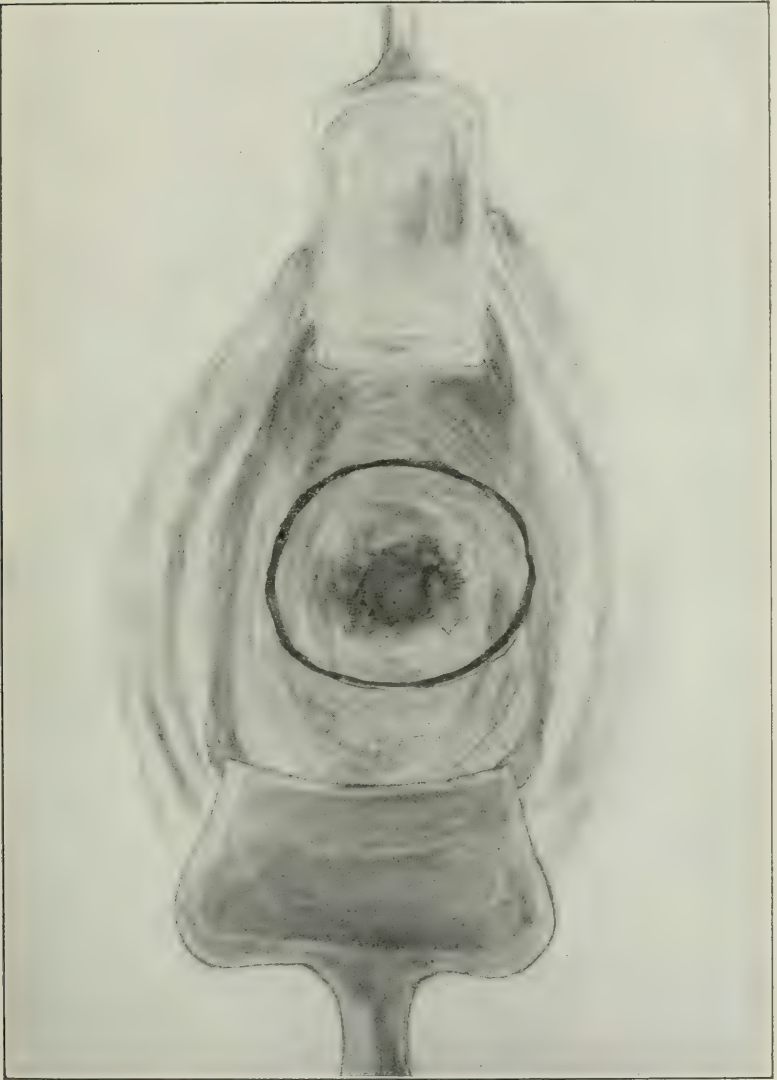


FIG. 2.

It is just as important that the surgeon should appreciate the high degree of infectiousness of cancerous tissue as it is that the

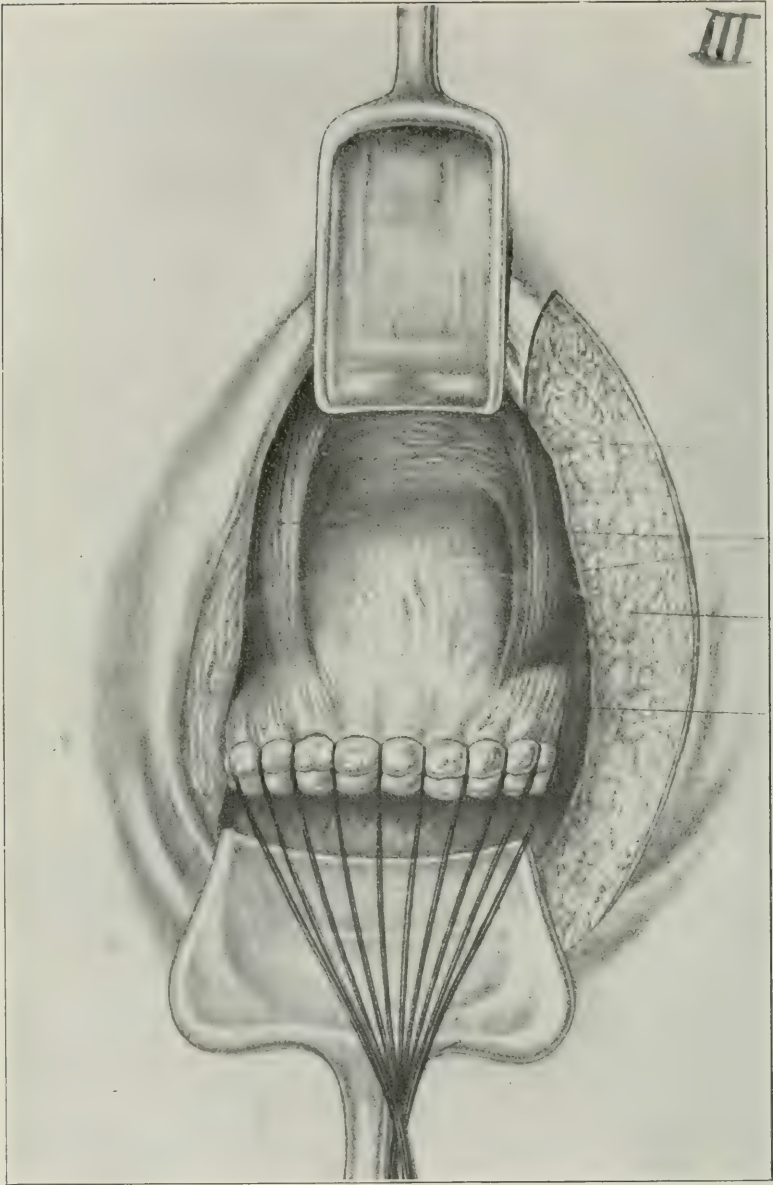


FIG. 3.

practitioner should recognize any symptom which is significant of this disease. The radical operation has demonstrated that infiltration and glandular enlargements, apparently cancerous, are frequently inflammatory in character, and that cases apparently in-

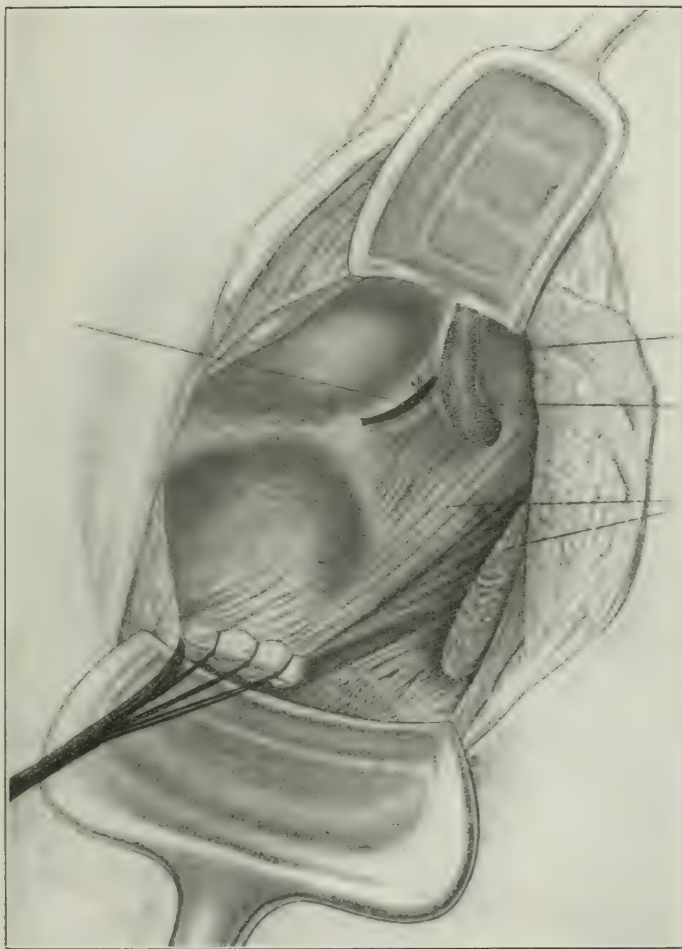


FIG. 4.

operable by reason of such extensions, are readily operable by this technic. As a result of this greater operability, the primary mortality following this greater technic must be considered when estimating its true value.

The term "*recurrent carcinoma*" is a misnomer and misleading,

in that it does not express what actually occurs. What does actually occur in a vast majority of cases is one of two things. Either some of the cancerous tissue has escaped removal, or cancerous tissue has

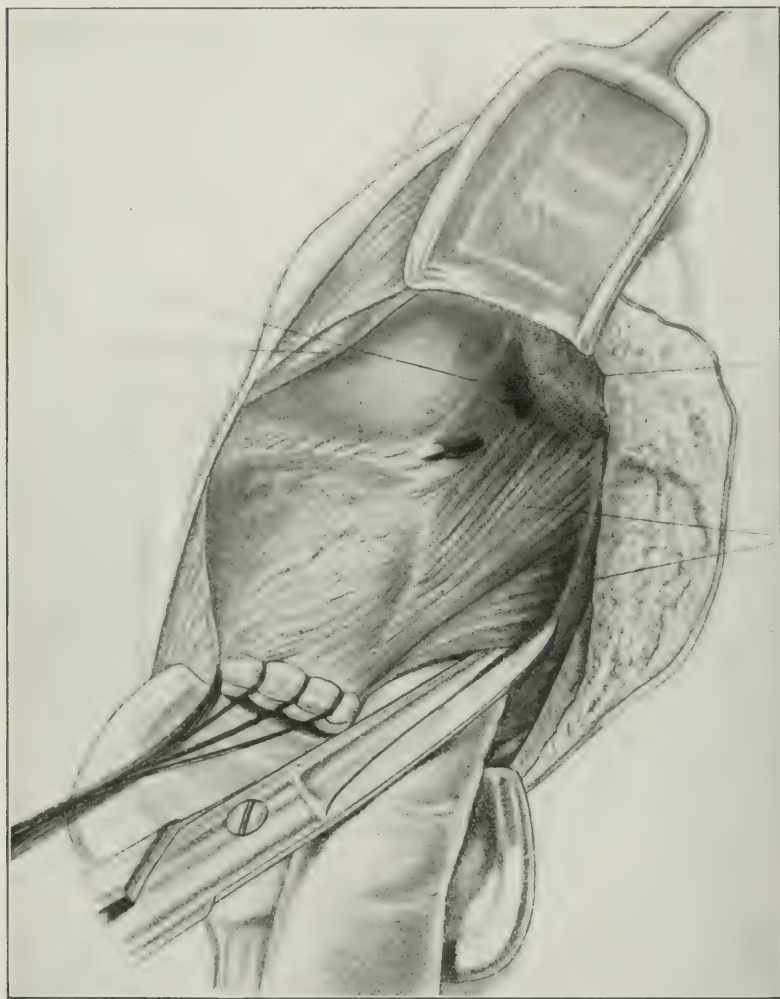


FIG. 5.

been disseminated or implanted in the wound by the manipulations of the operator. The possibility of cancer dissemination by extrusion of cancer infection into the circulation, as a result of injudicious and rough handling of the growth, should not be lost sight of.

I have here a specimen of implantation cancer which I have taken the liberty of presenting to you. Not that this condition is rare, but because this is a particularly instructive case. This specimen was excised from the abdominal wall, including the scar from a previous operation in the near median line on the left side. This patient gave a history of having undergone an operation for cancerous obstruction of the rectum and sigmoid a few months previously.

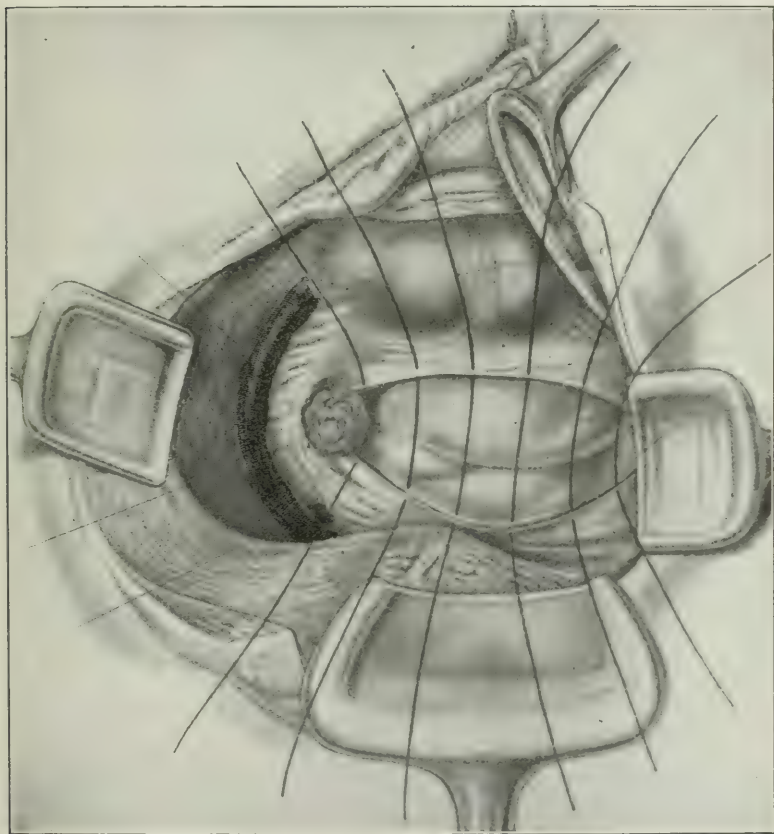


FIG. 6.

There were no adhesions of the bowel nor of omentum to the peritoneum. The peritoneum is not involved. This is a case where the manipulation of the cancerous bowel during resection infected the abdominal incision through which the operation was being performed.

The older surgeons recognized the danger of puncturing, for diagnosis, apparently fluctuating tumors when they were probably mal-

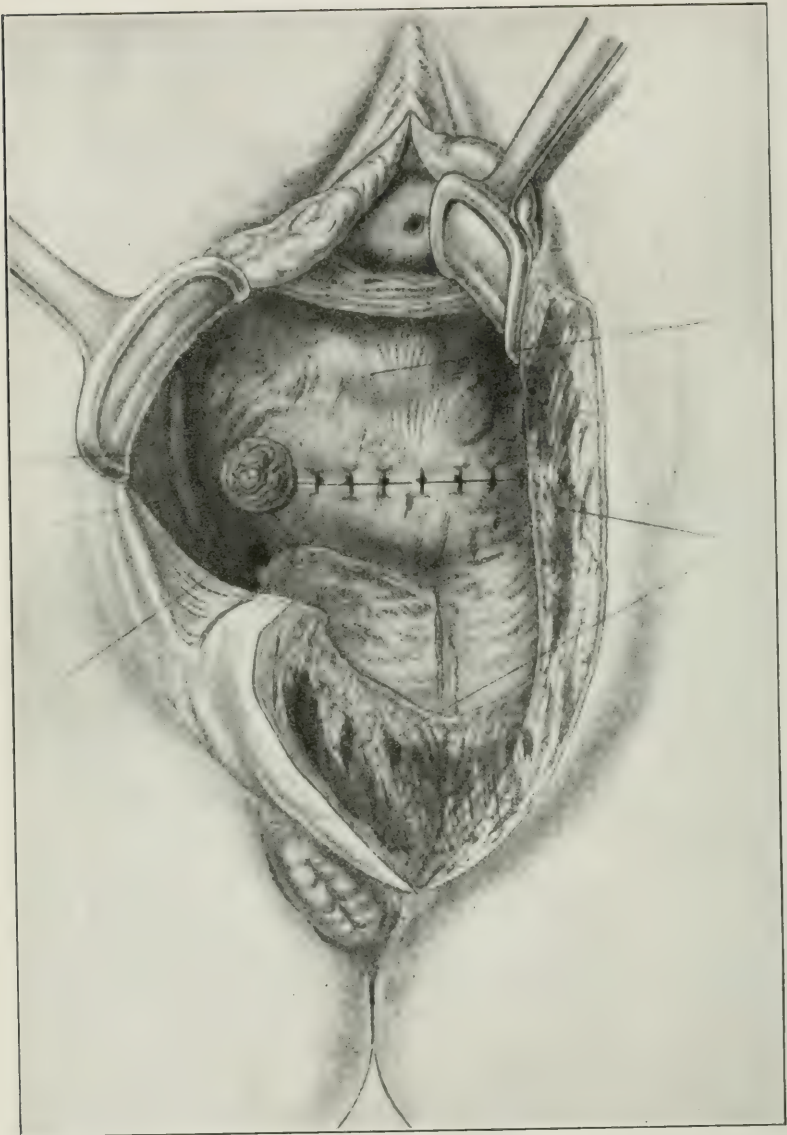


FIG. 7.

ignant, for fear of rapid growth after such treatment. The danger of rapid growth after partial removal of cancer or after cutting a piece out of it, is not apparent, it is real. The small excision for diagnosis, as usually practised, is a procedure which is far from harmless. Such excisions, unless entirely in healthy tissue or unless immediately followed with actual cautery are liable to give rise to dissemination of cancer.

With the exception of certain epitheliomata, it was in cancer of the breast that something like a reasonable result from operative procedure for cancer was first obtained. With some little changes in the technic of this operation we have obtained results, which, compared with cancer in other regions, might almost be called satisfactory. We may take the technic of this operation, which embodies all that goes to make up the later operative technic of this disease, as a technic typical for operation for cancer in other organs.

It is unnecessary for our purpose to describe in detail the well-known radical operation for cancer of the breast; but rather to point out such steps in the technic as have a tendency to make the operation more successful. While we are aware that sharp excision has been recommended, it has been our practice, after dividing the skin, and the underlying fat with the knife or scissors (with the exception of the division of the pectoralis muscles), to finish the operation as much as possible without use of sharp instruments. We endeavor to leave sufficient pectoralis muscles to cover the axillary vessels and to fill in the axillary space so as to avoid edema of the arm from scar pressure on the vessels. All glandular tissue, as well as the breast itself, with its sublying muscles, is removed by evulsion. This not only secures against opening carcinomatous tissue, but is followed by a minimum of hemorrhage. As a rule, only one or two, and frequently no hemostats are required after tearing the breast and muscles from their attachments. The carcinomatous glands themselves have a well-marked limiting capsule which does not so easily tear, but which is easily cut into. Gauze dissection should be carried on carefully and with due appreciation of the danger of opening carcinomatous atria. The aim in resecting the glandular structures should be to make the breach between the healthy structures and the cancerous structures as great as possible. The glands lying along the long thoracic vessels should not be overlooked. The wound should be closed by plastic flap from the side or from the abdomen. The opposite breast may be mobilized and made to assist in closing the wound. The patient is x-rayed immediately after the operation. I have been able to gather the end results in fifty-two cases of my own

experience, by having the patients present themselves in person or by having my assistant go to see them and by letter from their physicians. Of the sixty-two cases up to date, including cases operated within the last year, there was no primary mortality. Of the fifty-two cases operated from one to thirteen years, thirty-seven are still living, and fifteen are dead. Of the twenty-five cases operated up to 1908, eighteen are still living. It is possible that a number of cases not heard from might reduce this unusually good result. It is also possible that a larger series of cases would reduce the percentage of cures. I do not insist on these statistics of my own, except in so far as they indicate that our working theory has been correct. Several of the patients who died of cancer lived over five years after the operation.

In Cases II, XII and XX of this mortality list, a history of simple breast amputation was given with evidence of dissemination of carcinoma, and in all these cases a prompt continuance of the growths was noted following our radical operation.

Case XX. Had had a simple amputation of the right breast and presented herself with a continuance of the growth, for which a radical operation was done. The left breast, also cancerous, was removed by the radical operation. The right breast continued to develop the disease, while the left remained free from cancer.

Case XXVII. Was treated with cancer paste eight years before the development of a regrowth in the same breast. She lived three years after the radical operation. She died at Hot Springs, Ark., and I am told by her son of other disease (nephritis). However, I have credited her case with having internal metastasis.

Cases II and III of this series will serve to illustrate what may be accomplished even in apparently hopeless cases.

CASE II.—Lima, Ohio, aged sixty-two. Operated, 1904. Referred by Dr. Laudick. Immense cancerous mass in left breast; unusually large glandular involvement of axilla. Broad infiltration of skin. Operation undertaken with no hope of permanent result. Plastic closure. Present condition, nine years after operation, reported by Dr. Laudick, Lima, Ohio, patient in excellent health; no regrowth.

CASE III.—Chicago, Ill., aged thirty-seven. Operation St. Joseph Hospital June 7, 1905. Large open foul discharging cancer of right breast. Breast fixed to chest wall; marked involvement of axilla and supraclavicular glands. Case declared inoperable in Chicago as well as by myself. Operation undertaken under protest with the view of removing stinking breast mass. Axillary space and supraclavicular space successfully cleaned out. Clavicle resected. Gland size of "lima bean" finally detached from the subclavian. Large skin defect closed by plastic from opposite chest, back and abdomen.

Wound healed by first intention. Recovery. Patient lived five years after operation, four and one-half years in good health. Cancer redeveloped in mediastinum and in former operation scar.

There is a similarity both in the technic and in the operability in radical operations for breast cancer and for uterine cancer.

The case of Mrs. N., Chicago, Ill., advanced cancer of cervix, illustrates some of the possibilities of the greater vaginal operation for cancer of uterus. Operation St. Joseph Hospital, Nov. 2, 1910. Patient forty-three years of age. Duration of symptoms about one year. Cervix broken down, bleeding profusely on touch. Posterior vaginal wall involved in cauliflower growth. Uterus firmly fixed in pelvis. The vagina and cervix were involved to such an extent that in the preliminary excochleation, Douglas' culdesac was opened through the posterior cervical and vaginal wall.

The opening in Douglas' culdesac was packed with gauze, the cuff formed and sutured, and the typical operation proceeded with. The ureters were easily brought into view, and a broad excision into the parametrium made. Patient returned one year after operation. Examination revealed the remaining vagina, loose and free from infiltration. Patient gained 24 pounds in weight. Two years and four months after operation patient presented herself for treatment for pain in epigastrium and stomach disturbance. Vaginal examination still negative. Diagnosis: gall-stones. Three stones were found in the cancerous gall-bladder. Stomach and liver were involved. Patient died Aug. 1, 1913. No postmortem was allowed. Examination of abdominal viscera at the time of gall-stone operation led to a diagnosis of primary cancer due to gall-stones and not metastasis from pelvis.

The parametrium pierced by the ureters and carrying the lymph and blood-vessels bear the same relationship to the uterus in this disease as do the axillary structures to cancer in the breast. With the exception of cancer of the body of the uterus, the simple removal of the uterus for this disease gives about the same result as that which was obtained by simple removal of the breast in cancer, a result which was anything but encouraging. Simple cauterization, by reason of its lesser danger of dissemination, gave even better results than simple hysterectomy; just as cancer paste gave just as good or better results in cancer of the breast than did simple excision of the gland.

The ureters are the only important structures in the parametrium which need to be feared. In simple vaginal hysterectomy it is necessary to hug the uterus closely for fear of wounding or ligating

these structures. In fact, the operator who would make his excision anywhere but near the uterus was recklessly bold. With the recognition of the fact that all symptoms of cancer of the uterus are late symptoms; that all operations for cancer of the uterus are late operations; with the recognition of the extreme infectiousness of cancer, we need not be surprised in finding that operations for cancer of the uterus gave very discouraging results.

With a view to establishing an operation similar to the radical operation for cancer of the breast, Wertheim developed his radical abdominal operation which consists in laying bare the ureters from the point where they cross the iliacs to their insertion into the bladder and laying bare the lymph glands in the pelvis. With the ureters in sight the uterus with its parametrium was removed together with the vault of the vagina and, when necessary, part of the bladder or rectum all in one piece. The enlarged glands in the pelvis were also removed. The incision was carried through the parametrium well up to the pelvic wall. Very early in the history of this operation it was noted that in those who died as a result of a continuance of the disease the abdominal and thoracic organs showed involvement. The structures about the vagina as well as the vaginal scar remained free in marked contrast to the usual experience. It later developed that the enlarged glands in the pelvis were very frequently inflammatory and not cancerous, and that when these glands were cancerous the case usually went on to further development of the disease higher up, so that the advantage of this operation remained in the complete and broad resection of the parametrium and vault of the vagina as far as possible from the cancerous tissue itself. This operation also developed the fact that many cancerous uteri which were fixed in the pelvis, apparently hopelessly inoperable, were so by reason of inflammatory and not cancerous adhesions. Many of these cases were readily operable by this method. As a preliminary step to the operation, the cervix is thoroughly curetted with a large sharp curet and thoroughly cauterized by actual cautery (excochleation) to prevent infection and dissemination by implantation. In the course of the operation this entire area is closed off by the use of angular clamps. The advantage of the Wertheim operation accrued from the laying bare of the ureters through the parametrium to their point of insertion into the bladder. Since it has been found that the removal of the pelvic glands is not essential to the result of the operation and since the greater vaginal hysterectomy as devised somewhat later by Schauta accomplishes the broad excision of the parametrium and vault of the vagina with the ureters

in view of the operator, we have abandoned the abdominal for the vaginal radical operation, in that the latter operation carries with it a lesser mortality and still permits an excision approaching the thoroughness with which the cancerous breast may be removed.

Most of these illustrations are taken from Prof. Schauta's original drawings which very nicely demonstrate the operation.

Fig. 1 represents two specimens removed by the Schauta greater vaginal hysterectomy. I draw your attention to the broad excision through the lateral limits of the parametrium as well as the considerable excision of the vault of the vagina. You will note here, that the ovaries and tubes are not removed. Cancer of the cervical portion of the uterus does not produce metastasis in the tubes and ovaries; cancer of the body of the uterus is a comparatively benign affair and does not call for such an extensive operation as we are describing. I may mention, however, that in cancer of the corpus uteri, the tubes and ovaries should be removed and the operation ordinarily done by simple vaginal or abdominal hysterectomy. I may here add that in simple vaginal hysterectomy I have substituted the cautery for the knife or scissors.

Illustration No. 2 illustrates the first step in the operation. At the location of the cervix we have endeavored to show a deep charred crater. The preliminary step in the operation consists in a very thorough curettage with large sharp spoon, followed by an extensive and thorough actual cauterization. A circular line is now marked off in the vagina with a sharp instrument and at intervals of about an inch along this line a series of volsella catch up the mucosa in such a way as to facilitate the resecting of a cuff or circular flap. This line is ordinarily placed at the junction of the middle and upper third of the vagina. If the vagina itself is involved, this cuff should be started much lower down. If necessary, as low as the vulva, so that the entire vagina will be removed. This vaginal cuff is now resected upward from its sublying cellular tissues to about the level of the cervix.

Illustration No. 3 shows the completion of the first step in the operation and the beginning of the next. The cuff which has been resected is now sewed together by several interrupted sutures, the ends of which are left long and tied together to serve as a tractor. All instruments and gloves used in the operation up to this time should now be discarded. You will note that we have from now on a thoroughly aseptic field for operation. The carcinomatous tissue is effectually inclosed in the sutured flap or cuff.

The next step in the operation is the freeing of the vagina and

cervix from the bladder, which is accomplished in the ordinary manner by blunt or gauze or finger dissection. You will note here illustrated in Fig 3, what Schauta calls or terms the "Blasenzipfel." We will call them "bladder columns." They are reflected, as you note, from the bladder to the sides of the cervix and are implanted in the parametrium on either side. Under these columns will be found the ureters, which are the "corpora delecti." If it is now found that the bladder itself is too thoroughly involved in the cancer, or if conditions unforeseen present themselves which make the case inoperable, the operation may be abandoned at this time and excision with excochleation of the cervix substituted as a palliative measure.

We will now proceed with the next and most important step in the operation, Illustration No. 4, the laying bare of the ureters. We now carefully dissect backward the previously described "bladder columns" largely by blunt dissection, from their insertion in the parametrium. In the course of this dissection the ureters are brought to view as they emerge from their slit in the parametrium, first on one side, and then on the other. To facilitate this manipulation and to make the structures easily accessible, the Schuchardt incision is made extending from the lower apex of the lesser labium through the perineal structures to the side of rectum. A flat gauze pad placed on this incision and retraction with a speculum with the assistance of a few ligatures checks the hemorrhage from the same. The ureters are now dissected from the parametrium. This is ordinarily accomplished with the finger. Sometimes, if they lie in cancerous tissue, they may require careful instrumental dissection. Ordinarily, though surrounded by cancerous tissue, the ureters themselves are free of cancer. The uterine vessels now plainly in sight lying back of ureter are ligated as high as possible. It is sometimes remarkable how a retracted parametrium now becomes mobilized.

Douglas' culdesac is next opened broadly in the usual manner. Protecting the rectum with the finger, the ureter all the while in sight (Fig 5) the parametrium on the left side is divided well up to its bony attachment. Ordinarily a branch of the median hemorrhoidal is divided in this step of the operation and should be ligated. The parametrium on the right side is treated in like manner. If the anterior uterine space through the peritoneum has not been opened, this should now be done. The uterus is now hanging by its broad ligaments only; the broad ligament is divided between

the ovary and uterus on either side. The ovaries and tubes are not removed.

Fig 6. The abdomen is now thoroughly and carefully closed by suturing the peritoneum, making the ovarian stumps extra-peritoneal by fixing them in the lateral angles of the peritoneal slit, as in Fig 7.

The paravaginal cellular tissue is now loosely packed with several strips of gauze. The Schuchardt incision is closed as in ordinary perineorrhaphy. The gauze strips should be removed, beginning about the eighth day, removing one strip at a time each day, as the paravaginal tissues contract rapidly and may otherwise form a blind pouch locking up or favoring infection.

A search of the literature on cancer of the breast and cancer of the uterus, reveals the following statistics.

WERTHEIM OPERATION.

Schindler (R.). Statistische und Anatomische Ergebnisse der Wertheimschen Radikal Operation des Uterus Karzinoms. *Monatschrift f. Geburtshülfe u. Gynaek.*, Berl., 1906, xxiii, 78; 371, 502.

Abstract.—Looking up the literature, the experiences of the Wertheim operation have so far been rather scanty.

Winter reported at the Congress of Giessen on 108 cases collected from the literature, of which, with a primary mortality of 24.6 per cent., 45 (41.6 per cent.) relapsed during the first year.

Funke reports from Freund's clinic eleven cases, of whom two died; five remained well five years after the operation.

Freund reports on fifteen cases, with two deaths, from injuries to ureter; five died of relapse; three showed local relapse. Three cases of cancer confined to uterus remained well, one case more than two years.

Pfannenstiel and Kroemer had from 1899-1907, three deaths and three relapses (number of cases operated not mentioned).

Zweifel reported in 1902 a primary mortality of 15 per cent.

Jacobs reported in 1900, fifty-two cases, with four deaths, and sixteen deaths from relapse, and sixteen others relapsed. Later he reported on seventy-five cases, with twenty-eight permanent cures (37 per cent.).

Morisani reports on fourteen total extirpations, with one death, one relapse after eight months; ten cases have so far remained well.

Gattorno had of eighteen cases, two deaths, two relapses, of which one died.

Jayle in Paris reports on nine cases, three deaths, six relapses. Kleinhans of Prag reports on thirty-two cases, three deaths, three relapses.

During the last two years (1904 and 1905), appeared the following reports:

Wertheim had of fourteen cases (one series) 29.2 per cent. operable cases; had after four years' observation nine cases free from relapse (18.5 per cent). Furthermore, he had thirty-one cases (three years) 34 per cent. operable cases, nineteen remained free from relapse (27.5 per cent.). Also forty-three cases (two years), operable cases, 51 per cent., twenty-six remained free from relapse (31 per cent.).

At the Congress at Breslau, Wertheim reports absolute cures in 18.2 per cent. after four years' observation, but his primary mortality is still 17 per cent.

At the Congress at Kiel (1906) he states that most of his relapses occurred during the first two years and he estimates the absolute cures at 11 per cent. after five years' observation, 23.4 per cent. after four years' observation, 25.8 per cent. after three years' observation, 24.4 per cent. after two years' observation.

Pankow reports at the Congress at Breslau on cases operated partly after Koenige, partly after Wertheim, a primary mortality of 26.7 per cent.

Bumm reports on seventy-five cases, of whom fifty-six were under observation for more than one year. Ten patients died of the operation; of the other forty-six, eleven have already died of relapse, six are still living with relapse, six could not be heard from; thus twenty-three are still living without relapse (twenty of them after two years); therefore, 50 per cent. cure with an operability of 90 per cent. and a primary mortality of 17.85 per cent. (total mortality 24 per cent). He hopes to reach at the most favorable estimate an absolute cure of 30 per cent.

Döderlein reports on 115 Wertheim operations; an operability of 65.7 per cent. and a primary mortality of 16.5 per cent. (after one and one-half to two and one-half years' of observation), twenty cases free from relapse, which would give a permanent cure of 44 per cent. (calculated according to the method of Winter).

Author's own cases operated at the Graz clinic. In all 117 cases; of these sixteen died (13.6 per cent. for all cases). If only the cases operated up to 1903 are considered, we get a mortality of 15.21 per cent.; for the cases operated to 1902, 17.18 per cent. mortality, and for the cases operated up to 1901 a mortality of 7.4 per cent.

The causes of death were: collapse, peritonitis, sepsis, thrombosis

of right pulmonary artery, fatty degeneration of heart, anemia, dilatation of heart, etc.).

Permanent results of the 101 cases surviving: twenty cases could not be heard from. Of the eighty-one cases remaining, observed from one to five years after operation, five died without showing relapse.

The author then mentions thirty-three cases operated by Rosthorn, Kermauner and Lameris. Of these thirty-three cases, three died of the operation (a primary mortality of 9.09 per cent.), five could not be heard from, leaves twenty-two cases. Of these we get 77.2 per cent. relapse and 22.7 per cent. permanent cure.¹

The operability of the vaginal cancer operation has increased during the last eleven years. The total operability of the eleven years amounts now to 54 per cent., but in the last three years it reached from 60 to 70 per cent.

In 1911, forty cases were operated by the abdominal operation. The mortality was 7.5 per cent. (4.53 op.).

The total mortality for the eleven years is now forty-four; 498, that is, 8.8 per cent. If only the last four years are considered, we get ten deaths of 212 cases, *i.e.*, 4.6 per cent.

TABLE OF OPERABILITY.

Year	No. cases	Abdom. operation	Refused operation	Op., Schauta	Per cent.
1901	116	.....	9	47	43.9
1902	95	.....	8	29	33.3
1903	88	.....	6	37	45.1
1904	96	.....	6	49	54.4
1905	83	1	4	49	62.8
1906	93	6	2	47	55.2
1907	84	13	.....	28	39.4
1908	94	4	4	50	58.1
1909	88	2	2	59	70.2
1910	80	4	3	50	68.4
1911	90	10	1	53	67.0
	1007	40	45	498	54.0

As to permanent cure in the years 1901-1906, there were 258 cases operated; twenty-nine died of the operation, five of inter-current disease; remaining 224 cases. Of these eighty-five are still well (after five years). This gives a percentage of permanent cure of 37.9 per cent. considering all those not heard from as relapses.

¹F. Schauta. Bericht über das 11. Beobachtungsjahr der erweiterten vaginalen Krebsoperation. *Monatschrift Geburtsh. u. Gynæk.*, Berl., 1912, xxxiii, 202-207.

Note.—There is an article by Wertheim, entitled: "The Extended Abdominal Operation for Carcinoma Uteri" (based on 500 cases) translated from the German in AMERICAN JOURNAL OF OBSTETRICS, 1912, vol. lxvi, pp. 169-232. von Ott (D). Vergleichende Schätzung der verschiedenen Methoden der chirurg. Behandlung der Gebärmutter krebsses (comparative estimation of the various methods). *Zentralblatt f. Gynäk.* Leipz., 1900, xxxiii, 1394-1406.

TABLE I

	Wertheim	Stande	Schauta vag.	Ott. simple vag.
Number of cases.....	104		162	277
Primary deaths.....	21		18	5
Per cent. of mortal.....	20.2		11.1	1.8

All these cases were operated in Ott's Clinic in St. Petersburg.

TABLE II

	Wertheim abd.	Stande vag.	Schauta	Ott. simple vag.
No. of cases operated more than five years ago.	116	58	47	191
Died of operation.....	27	9	9	4
Per cent. of mortal.....	23.3	15.5	19.1	2.1
Per cent. of operability.....	42.2	64.5 (72.3)	48.7	42.8
No. of cases surviving operation.	93	49	39	187
Cases excluded for various reasons.	6	2	4	0
Cases not heard of.....	0	6	0	35
Cases observed five and more years.	87	41	34	152
Of these without recurrence....	51=58.6 per cent.	17=41.5	13=38.2	55=36.2
Winter's cases.....	24.7	23	16.7	15.5
Waldstein's.....	19.16	.....	13.5	15.1

These figures were taken from the most favorable reports of each operation.

CANCER OF BREAST.

Fidelin. Resultats eloignes de l'ablation du sein pour cancer. Paris thesis. 8.0 Paris, 1909.

Amputation Without Curetting Axilla

Kuster had 13.30 per cent. cures.

Hildebrand 30 per cent. cures.

Amputation With Curetting Axilla

Kuster 24.60 per cent. cures.

Of 600 cases operated by Schede, Carle Cheyne, etc., 168 were cured (27 per cent.).

Cestan collected in 1906, 642 cases, of which 333 had local recurrence or 52.6 per cent.

Amputation with curetting axilla, removing aponeurosis of pectoralis major and superficial layer of this muscle.

Barker obtained in ninety-two cases 33 per cent. cures, living more than three years, and 16 per cent., living more than five years.

Rosenstein had of 152 cases operated, 22.7 per cent. cures.

Sheild had of 60 cases operated 20 per cent. cures.

Cheyne had of 56 cases operated 48.6 per cent. cures.

Halsted had of 161 cases operated 42.8 per cent. cures.

Halsted 10.5, local recurrences.

STATISTICS OF THE MASSACHUSETTS GENERAL HOSPITAL.

From 1 to 6 months	Cures 20 per cent.
From 6 to 12 months	Cures 16.6 per cent.
From 1 to 2 years	Cures 24 per cent.
From 2 to 15 years	Cures 24 per cent.

RESULTS OF THE TWO METHODS.

Cures for the complete operation..... 16 per cent.

Cures for the incomplete operation..... 25.9 per cent.

Cures for the half complete operation.... 25.3 per cent.

The Massachusetts surgeons explain the inferior results of the complete operation by saying that it reverses the limits of operability.

Greenough, Channing, *et al.* End results of 376 primary operations for carcinoma of the breast at the Massachusetts General Hospital from 1894-1904. (*Ann. of Surgery*, Phila., 1907, xlv, 20-27.) Of the 376 patients operated, sixty-four are now alive at a period of from three to thirteen years. Complete operations were performed in 160 cases; in this group are included all operations in which the whole breast, axilla contents, and sternal portion of the pectoralis major were removed. Of the 160 cases operated 16 per cent. were successful in preventing recurrence of the disease. In twenty-six of the 160 cases the neck was dissected and lymphatic glands removed, but only in one case in which the glands removed were infected was the operation a success in preventing a recurrence.

Semicomplete operations were performed in seventy-five instances (in these cases the pectoralis minor was not disturbed); 25 per cent. remained free from recurrence. *Incomplete operations* (pectoralis major was not removed), twenty-two cases or 25.9 per cent. remained free from recurrence.

Ochsner.—Final results in 164 cases of cancer of the breast. (*Ann. of Surgery*, 1907, xlv, 28-32.)

Fifty-four cases are still living.

Time since operation,	1 year,	9 cases.
Time since operation,	2 years,	11 cases.
Time since operation,	3 years,	5 cases.
Time since operation,	4 years,	7 cases.
Time since operation,	5 years,	4 cases.
Time since operation,	6 years,	5 cases.
Time since operation,	7 years,	4 cases.
Time since operation,	8 years,	1 case.
Time since operation,	9 years,	3 cases.
Time since operation,	10 years,	1 case.
Time since operation,	11 years,	2 cases.
Time since operation,	13 years,	2 cases.

R. Berck.—"Resultate der in den letzten 5 Jahre an der chir. Klinik zu Greifswald operierten Fälle von Mamma Carcinom" (Thesis) Greifswald, 1899; sixty-four cases were operated by the radical operation. Only fifty-five cases could be heard from.

1. Without local recurrence still alive after
three and more years..... 8 or 24.2 per cent.
2. Without local recurrence:
 - (a) Died of intercurrent disease..... 3 or 9.1 per cent.
 - (b) Died of inner metastases..... 7 or 21.2 per cent.
3. Without local recurrence.
Total of 1 and 2..... 18 or 54.5 per cent.

Résumé of results during the five years of fifty-five cases:

1. Without local recurrence are still living, 20 or 36.4 per cent.
2. Without local recurrence, died of inter-
current diseases.....4
Died of intercurrent diseases and inter-
nal metastases.....12

16 or 29.1 per cent.

N. Kekischeff.—"Ueber die End resultate der Brustkrebsoperation." (Thesis, 8 Berne, 1906).

In Kocher's clinic 103 cases of mammary carcinoma were observed during the last ten years, of which only ninety-five were operated upon. The radical operation was performed seventy-one times. Only sixty-seven cases could be heard from.

Year	Number of operated	Number of answers recorded	No. cases without recurrence	Per cent. of No. of operative cases	Per cent. of answers recorded
1895	11	5	3	27.2	60.0
1896	9	2	1	11.1	50.0
1897	10	6	2	20.0	33.0
1898	6	4	3	50.0	75.0
1899	10	7	2	20.0	28.5
1900	9	3	1	11.1	33.3
1901	9	4	2	22.2	50.0
1902	13	11	2	14.6	18.2

Average per cent. permanent cures, 32.8.

W. S. Halsted.—“The results of radical operations for the cure of cancer of the breast.” *Transactions Am. Surgical Association*, (1907).

Group 1.—Complete sub-clavicular and neck operations. Total number of cases 210, cured 89.

Group 2.—First op., complete pectoralis or subclavicular.

Second op., supra-clavicular or neck parts.

Axilla involved..... 124 cases

Axilla and neck involved..... 44 cases

Total..... 168

Actual cures	Axilla involved	Axilla and neck involved
Cured 3 yrs. and over.....	17 22	3 or 20 5 “ 27
Cases, not cured.....	45	34 “ 79

Group 3.—Only complete pectoral operation. 232 cases.

Cases actually cured..... 75

Cured three years after operation with later metastases 14

Cases cured not less than three years..... 89

Cases not cured..... 121

Cases cured three years and more..... 89

Total number of cases..... 232

336 WEST BERRY STREET.

THE RELATIONSHIP EXISTING BETWEEN THE
MECHANISM AND MANAGEMENT OF THE
THIRD STAGE OF LABOR.¹

A REPORT OF 600 CASES FROM THE ROTUNDA HOSPITAL, DUBLIN,
IRELAND.

BY

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IN reviewing reports of observations on the mechanism of the third stage of labor one is met with the difficulty of interpretation not so much as to the original meaning of the two men whose names are so closely associated with the theories of separation and expulsion of the placenta, but because various divergent views have become read into and incorporated with the opinions and name of one or other of these authors.

It is customary to speak of the mechanism of separation as that of Schultze or Matthews Duncan, but it is not always clear just what the individual observer considers the distinguishing features of each mechanism. Personally, I understand Schultze's mechanism to be the separation of the placenta by the formation of a retroplacental hematoma and the escape of the placenta from the uterus, fetal surface first, inverted through the membranes. By Matthews Duncan's mechanism, the placenta is separated at the edge first, without the formation of a retroplacental hematoma, and escapes from the uterus edgeways or maternal surface first, not inverted through the membranes. When the placenta is separated by Matthews Duncan's mechanism the edge always passes out of the uterus first, after which it may present at the vulva in one of three different positions, viz., some portion of the maternal surface appearing first; second, edgeways folded back on the fetal surface; third, edgeways more or less folded on the maternal surface but not inverted through the membranes.

The conflicting statements by equally reliable observers as to the frequency of occurrence of these two mechanisms indicates the existence of some factor that is not common to the different series of observations, and on this factor the varying results depend. I

¹ Read before the Twenty-sixth Annual Meeting of the American Association of Obstetricians and Gynecologists at Providence, Rhode Island, September 16-18, 1913.

think that the method of managing or conducting the third stage is this varying factor and is responsible for the extreme differences of opinion as to the comparative frequency of the occurrence of Schultze's and Matthews Duncan's mechanisms.

The method of conducting the third stage in the Rotunda Hospital, where these observations were made, is as follows:

Within two or three minutes after delivery, which was conducted in the left lateral position, except in extraction after version and in difficult breech cases, the patient was turned on her back with her knees drawn up and separated. The attendant "controlled" the uterus by sinking his hand, ulnar surface down, into the abdomen above the uterus, so that the fundus fitted into the hollow of his palm. The uterus was not interfered with as long as it contracted and relaxed normally and showed no disposition to fill up with blood. Here it may be noted that, as far as statistics are concerned, this method of "control" which, however, must not be confused with massage of the uterus, has no effect on the mechanism of separation, as in a series of 150 cases where the uterus was not "controlled" the relative percentage of occurrence of the two mechanisms was the same as in the larger series from the Rotunda Hospital. One point that did appear, a matter of clinical observation and not direct measurement, was that the amount of blood poured out behind the placenta was greater in the cases in which the uterus was not "controlled."

The placental stage is as much a part of labor as the first and second, and is as much subject to the laws of uterine action; consequently, the latter should not be disturbed in a normal case. Throughout the first and second stages the uterus contracts and relaxes rhythmically and regularly. If this is normal uterine action during the first and second stages, why should it not be considered normal for the third stage? The usual teaching, massage of the uterus to stimulate and maintain tonic contraction during the time while the placenta is being separated, introduces a new and irregular, if not abnormal, factor in the mechanism of separation.

In normal cases, *i.e.*, those in which no bleeding occurred, thirty minutes were allowed to pass before any attempt was made to learn if the placenta had been expelled from the uterus. This rule was made to prevent premature attempts to "express," which is one of the commonest causes of retention of parts or all of the placenta and membranes. At the end of thirty minutes, if the fundus had risen and the uterus had become smaller, more globular, and freely movable in the abdomen; if the cord had descended

further through the vulva and failed to pull up when the uterus was pushed up toward the diaphragm, then it was considered time to "express," as the placenta was no longer subject to uterine action, but was lying in the lower uterine segment and upper portion of the vagina. If these signs were not obtained, no effort was made to express the placenta unless the patient showed some evidence of shock or hemorrhage. Occasionally, at the end of an hour, even if these signs were not obtained, attempts were made to deliver the placenta, but it was no uncommon occurrence to wait one and one-half to two hours and find that, even after this time, normal separation (Schultze's) occurred.

This was what we considered the rational method of managing the third stage of labor and is, fundamentally, the same method that has been practised in the Rotunda Hospital since its establishment in 1745.

In a series of 2600 cases in which the third stage was conducted as above described (with some exceptions to be mentioned later) the following results were obtained:

Fetal surface first—Schultze's mechanism: 2145 times or 82.5 per cent.

Edgeways or maternal surface first—Matthews Duncan's mechanism: 455 times or 17.5 per cent.

These observations were made as the placenta escaped from the vulva and show that, for cases managed by noninterference with uterine action, escape of the placenta fetal surface first is preponderantly more frequent than an edgeways or maternal surface presentation.

In 100 cases of Schultze's mechanism the exact point on the placenta that appeared first at the vulva was marked and the distance from the nearest margin measured. Contrary to Champney's results, our cases showed that this point varied from the placental center to half an inch from the margin, and no part showed markedly greater frequency than another. The figures were:

1/2 inch.....	= 13
1 inch.....	= 13
1 1/2 inches.....	= 8
2 inches.....	= 19
2 1/2 inches.....	= 12
2 1/2 inches.....	= 35
<hr/>	
Total.....	100

When the placenta appeared with a portion near the edge showing first, rotation usually took place while it was escaping from the vulva and the rest of the fetal surface was delivered before the membranes came away. This rotation might take place in either axis. Such action of the placenta would appear to lend strength to Holzapfel's contention that even when the placenta escaped frankly fetal surface first, it had presented edgeways at the internal os and had been converted subsequently.

To determine the truth of this assertion, I examined forty-three women by manual exploration. In all of these cases the portion of the fetal surface of the placenta that presented first at the internal os also presented first at the vulva, after which, however, rotation in either axis might take place. It was not until the placenta had traversed the vagina and was being expelled through the vulva that a change in the relative position occurred. The exception to this rule was found in those cases in which the maternal surface appeared first. In all of these the maternal edge of the placenta presented and came through the internal os first, rotation then occurring in the vagina, frequently from adhesion of the membranes. The results of these forty-three examinations were:

Fetal surface first, same point at os and vulva.....	= 23
Edgeways internal os and vulva.....	= 10
Edgeways internal os, maternal surface at vulva....	= 10

At first sight this would look as if our percentages of occurrence of Schultze's and Matthews Duncan's mechanisms, mentioned above, were wrong; but it must be remembered that these observations were made on operative cases, many of them having accidental hemorrhage or placenta previa. Only operative cases were chosen, because examinations in these cases would not interfere with the clinical teaching material, intrauterine manipulations had already been carried out, consequently further exploration did not materially increase the risk of infection, and, finally, the fact that the patient was anesthetized freed her from the pain of the manual exploration and its possible effect on uterine action. On account of the danger of infection from too prolonged uterine manipulation, I did not attempt to determine the exact spot at which separation of the placenta began, but contented myself with observing that point on the placental surface that first presented at the internal os. In each instance, except those already referred to, the point's relation to the rest of the placenta was unaltered until the placenta was passing through the vulva, when rotation might or might not occur.

Recently I have had two opportunities for observing directly the

beginning separation of the placenta. In two cases of extraperitoneal Cesarean section, I waited long enough to see where the placenta first showed signs of separation, and in each instance it was close to the center. Implantation in one instance being on the fundus and anterior wall, in the other, on the fundus and posterior wall. Of course, two cases are not at all convincing but they furnish us with a visual observation of what may be termed practically normal uterine action, because in extraperitoneal Cesarean section the contractile portion of the uterine wall is not directly interfered with.

One other point of great importance in determining the normal, or at least the desirable mechanism, is to compare the percentages of incomplete membranes in the two classes. In the 2145 cases where Schultze's mechanism obtained, the membranes were incomplete in 108 or 5 per cent. On the other hand, in the 455 cases of Matthews Duncan's mechanism, the membranes were incomplete in 70 or 15.4 per cent.

Adhesion of the membranes has been advanced as an explanation for the occurrence of Matthews Duncan's mechanism, their unequal attachment being supposed to cause the placenta to turn over during its expulsion. This is undoubtedly a factor in turning an edgeways presentation to one in which the maternal surface comes first but cannot cause a change from a fetal surface presentation to one in which the placenta comes edgeways or maternal surface first. If adherent membranes were a factor in determining a Matthews Duncan's mechanism, they would be expected to be incomplete in more than 15.4 per cent. of cases, and how could a fetal surface presentation be accounted for when, as happens not infrequently, large portions, or all, of the chorion is missing?

I personally believe that the greater frequency of incomplete membranes in Matthews Duncan's mechanism is the effect and not the cause, the membranes being torn more often simply because of the unequal pull of the placenta in this mechanism, in contradistinction to the equal pull exerted by the descending placenta separated according to Schultze's mechanism.

Before drawing any conclusions from the foregoing figures, an examination of the class of cases in which Matthews Duncan's mechanism of separation occurs will bring out some more facts tending to show that it is proportionately even less frequent in normal labor than appears from the figures already quoted.

Separation of the placenta by the Matthews Duncan's mechanism can always be obtained by causing the separation to begin at the

edge instead of the middle. Naturally such a state of affairs obtains in cases of antepartum hemorrhage due either to accidental hemorrhage or placenta previa, and artificially it can be brought about by massage of the uterus. If well-marked antepartum hemorrhage, showing tangible separation of the placental margin, were to occur and be followed by presentation of the fetal surface of the placenta at the internal os and vulva, then the above statement as to the cause of Matthews Duncan's mechanism would not be correct; but it receives marked corroboration from our figures. There were twenty-eight cases of antepartum hemorrhage. In every one of these cases the placenta came edgeways, or maternal surface first, not inverted through the membranes. Always, in my experience, antepartum hemorrhage of any moment is followed by separation of the placenta according to the mechanism of Matthews Duncan.

Further evidence to the truth of the statement that Matthews Duncan's mechanism is the result of separation beginning at the margin of the placenta is that in three cases, during the performance of internal version, once accidentally and twice intentionally, I separated from the uterine wall a portion of the edge of the placenta about 4×1 inches. In these three cases the placenta came away maternal surface first.

Two other abnormalities of the third stage associated with an edgeways or maternal surface presentation are retention of the placenta and postpartum hemorrhage. In fourteen cases of postpartum hemorrhage it became necessary to express the placenta directly from the uterine cavity and in each instance it escaped edgeways, followed by a maternal surface presentation at the vulva. The same statement is true of thirteen cases of retained placenta in which the placenta had to be expressed directly from the uterus by Credé's method. That the placenta had not left the uterine cavity was demonstrated by the fact that pressure on the fundus drove the cervix down so far that it was visible and the placenta could be seen as it was expressed through the os. Expression of the placenta for postpartum hemorrhage occurring after it has left the uterus will, of course, have no effect on the manner in which the placenta presents.

In seven cases I demonstrated that, when the placenta is still in the uterus, with the fetal surface near the edge beginning to present, the presentation could be changed by massage and attempting Credé's method of expression. The retroplacental hematoma was squeezed out from behind the placenta, burst through the membranes at the lower margin and sent the edge of the placenta through the os first, when continued expression caused the placenta to escape

with the maternal surface presenting. Thus a primary Schultze's mechanism was changed into a Duncan's mechanism.

This change can be obtained whenever premature escape of the retroplacental hematoma is caused. The condition of affairs is then comparable to a case of antepartum hemorrhage in that the placental margin is separated first. Herein lies the reason why no attempt should be made to maintain tonic contraction of the uterus during the third stage of labor, as the massage necessary to stimulate uterine action is very likely to cause premature escape of the retroplacental hematoma. That Schultze's mechanism occurs with considerable frequency in those clinics where uterine massage is practised is explainable. The massage may not be vigorous enough to cause the escape of the retroplacental hematoma, or it may not be started until the placenta has already separated, as this sometimes occurs with the first postpartum contraction. This is shown in those cases in which the delivery of the placenta immediately follows that of the child.

To sum up—that mechanism of the third stage which results in the greatest percentage of cases in which there is complete delivery of the placenta and membranes, without trouble and without hemorrhage, must be considered normal.

Our results show that when the separation of the placenta is left to the unaided action of the uterus, Schultze's mechanism occurs not only with greater frequency (more than four to one) but also has the added advantage of having a smaller proportion of incomplete membranes (less than one to three). Therefore the conclusion is apparently justifiable that Schultze's is the more desirable mechanism. As by the Rotunda method of managing the third stage placental separation by Schultze's mechanism occurs in the great majority of cases, this mechanism must be considered the normal one where uterine action is not interfered with.

Although it must be admitted that there are a certain number of cases in which the placenta separates by Matthews Duncan's mechanism without discoverable cause, yet the fact that this is the mechanism obtaining in abnormal cases (antepartum hemorrhage, postpartum hemorrhage and retained placenta) furnishes sufficient ground for stating that Matthews Duncan's is the mechanism of abnormal cases, even if it is not to be considered abnormal itself. In addition, as the membranes are incomplete in a much greater number of cases it is also undesirable. To avoid its occurrence it is necessary to prevent as far as possible premature escape of the retroplacental hematoma, and this is attained by not interfering in

any manner with uterine action during the third stage, as it has already appeared that separation by Schultze's mechanism occurs in 82.5 per cent. of cases in which the uterus is not interfered with, and of the 17.5 per cent. of cases in which the placenta separates by Matthews Duncan's mechanism 2.2 per cent. were associated with some abnormality, leaving 15.3 per cent. of cases in which Matthews Duncan's mechanism occurs for no demonstrable reason when placental separation is left to the unaided uterine action. The introduction of an abnormal factor, massage or attempts to express the placenta from the uterine cavity, causes Matthews Duncan's mechanism to occur in the majority of cases, an undesirable result because of the increased percentage of incomplete membranes and their effect on morbidity in the puerperium.

In conclusion I wish to express my thanks to the Past Master of the Rotunda Hospital, Dr. Hastings Tweedy, at whose suggestion this investigation was undertaken, for advice and help throughout and for permission to use the hospital material and records; to the present Master, Dr. Henry Jellett, for permission to continue the use of the hospital material and records during my association with him; to Dr. B. A. H. Solomons, my colleague for three years in the Assistant Mastership, for much help in collecting the data; and to the nursing staff of the Rotunda Hospital, without whose help and hearty cooperation this study could not have been completed.

THE PROBLEM OF MAJOR PELVIC HERNIA IN THE FEMALE.¹

BY

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THE commonly used term "uterine prolapse" is, in the majority of cases to which it is applied, misleading or at any rate inadequate, for it indicates but one of the associated pathological features in a complex which, to all intents and purposes, is a true hernia of several, if not all, of the important organs in the female pelvis.

Under the usual nomenclature the fact is ignored that not only a part or all of the uterus, but a portion of the bladder and rectum, as well as the vagina, are involved in the common process of descent or protrusion; while the ovaries and some intestinal loops are not

¹ Read before the Twenty-sixth Annual Meeting of the American Association of Obstetricians and Gynecologists at Providence, Rhode Island, September 16-18, 1913.

infrequently contained in what may, roughly at least, be regarded as a hernial sac.

The desirability of a terminology more accurately descriptive of the whole pathology is not suggested with an idea that it is entirely novel or original, but rather to emphasize the importance of using a label comprehensive of the entire contents of a parcel rather than a single article, and while the hernial character of this condition has not infrequently been hinted at or even alluded to in terms, it has not, so far as the writer knows, been urged as essential to an improved and explicit nomenclature—one which will keep constantly in mind the complete pathological picture.

Pelvic hernia in the female would alone be sufficiently descriptive were it not that *minor* pelvic hernia, such for instance as the obturator, may occur, hence the entire title seems necessary for comprehensiveness.

In approaching the problem, one must, at the outset, disclaim all hope of putting forth a radically new method of dealing with the condition. In view of the variety of technical procedures already in the field, many of them ingenious, some logical, and a few grotesque, and the fact that, in the total, practically every possible means of support—from below, from above and from midway, not to speak of extirpation—has been advocated, it is well nigh impossible to suggest any entirely new single mode of attack.

The most that remains for one who would improve his results in this line of work is by a proper segregation of cases, adherence to certain fundamental objectives and principles, in the light of certain basic facts, to so coordinate some of the already practised steps of technic as to “standardize,” if one may borrow a term from modern mechanics (and naturally this whole problem is a mechanical one), a method of treatment, comparable in its way to those accepted for the cure of other herniæ, such as inguinal, umbilical and ventral.

Among the underlying aims, principles and facts to be borne in mind may be mentioned:

1. The necessity of restoring and maintaining, at least approximately, the normal position and relations of the important organs and parts involved, especially those which may still possess a functional activity. Of these the bladder and rectum must continue to functionate throughout life and with these should be included the vagina, except in advanced senile cases, when its function may, perhaps, be disregarded, while the specific function of the uterus is terminated by the menopause.

2. The fact that some, but not all, of the expedients available

in the radical cure of herniæ of the contents of the abdomen through its walls can be applied here. Thus muscular and fascial barriers or supports may, and in fact must, be constructed to prevent recurrence after the fashion, in a way, of abdominal herniæ; but in this form of pelvic hernia there is no true sac whose closure by ligation or suture will oppose recurrence, while the canal, which in this case is the vagina, must not, unless in exceptional cases of advanced senility, be closed or materially changed in character or direction but must, on the other hand, be restored as nearly as possible to its original form.

3. Recurrences must be as infrequent, at least, as in other forms of hernia treated by standard operative methods.

4. The operation should introduce no new element of postoperative pain or disturbance.

It may be safely assumed that any operative procedure for the cure of major pelvic hernia which disregards these objectives, principles and facts cannot be thoroughly ideal, and that the greater the departure from them, the less satisfactory will the result be.

In the light of this assumption, it should be of interest to briefly analyze some of the popular methods and note their compliance with and divergence from such fundamental aims, principles and facts.

Perhaps no operation has been more widely accepted and practised than that of interposing the uterus, either in extreme anteversion or even an inverted attitude, between the bladder and vagina, with or without amputation of the cervix, as the case may demand, and the addition of a perineal repair—the so-called Watkins-Wertheim or Wertheim-Watkins technic as one may choose to regard it.

In its favor may be said that it is pretty certain to prevent a recurrence, except in an extremely senile case with markedly atrophic and flabby uterus, when a descent of the organ carrying the bladder with it may occur even though it cannot parallel the pelvic axis.

On the other hand, this operation distinctly violates the principle that, especially during the period of functional activity, the organs involved should be secured in as nearly as possible their normal position and relations. To fasten a uterus either transversely or semi-inverted in the pelvis of a woman who has not reached the menopause is to so disturb relations as to greatly interfere with two essential functions, pregnancy and drainage of both menstrual and intermenstrual discharges; in fact, it is pretty generally recognized that this operation, when performed on a woman in the child-bearing period, should be accompanied by resection of the tubes to induce sterility. Again, it is asserted by good authority that prolapse

operations, as a rule, should be accompanied by sterilization of the sexually active woman, but the desirability of employing, if possible, a method which will not rob these cases of such an important function must be admitted. It is a question also if the bladder, which is then carried as it were on the back of the uterus, will not, when even moderately filled, sacculate in Douglas' pouch and have much the same difficulty in emptying as does the residual pouch of the male bladder behind an enlarged prostate.

Even when applied to cases beyond the climacteric the transverse or semi-inverted position of the uterus must necessarily interfere seriously with leukorrheal discharges from the uterine canal which admittedly exist in many of such cases while, as already remarked, if the postclimacteric uterus be small and flabby it may be forced down again by intraabdominal pressure. For such an organ can follow the pelvic axis—only this time, as it were, head first instead of feet first.

If the above reasoning be correct, it would seem that the interposition operation is not entirely deserving of the popularity which it has acquired.

Another type of radical operation for this form of hernia has been suggested and practised by Murphy, who either implants the fundus of the uterus into the split rectus or else brings it entirely through that muscle, divides the uterus antero-posteriorly and sutures each half upon the anterior surface of the rectus as two lateral flaps, after dissecting out the uterine mucosa.

This, more effectively than any other operation, disposes of the possibility of a recurrent descent of the uterus, but again, unless applied solely to the postclimacteric organ, destroys its functional capacity, as thoroughly for that matter as would a hysterectomy. And, again, although the inner end of the vagina is drawn securely up against the parietal peritoneum, it does not seem impossible in view of the loose areolar connection between vagina and bladder that a cystocele may not in time recur. In fact, the author of the operation remarks that if this should occur it must be corrected by an anterior colporrhaphy. It would also seem quite possible that the extreme traction produced on the vagina by a complete implantation of the uterus outside the rectus might be productive of subsequent pain.

A third method of procedure, and the simplest of all, provided one can be certain of its effectiveness, harks back to the primitive proposition of an effective repair of the perineum and an anterior colporrhaphy, plus, in most if not all cases, amputation of the cer-

vix. By this method no distortion of the position or relations of the organ is produced and no interference with function. Its weakness, as generally practised, is the large percentage of recurrences of the hernia, but we are assured by no less an authority than Hirst that he has followed this plan for a period of more than ten years and upon several hundred cases, without, so far as he has been able to ascertain, a single recurrence.

The inevitable conclusion to be drawn in comparing such results with those generally reported from the same type of operation is that in one case the perineal and anterior wall repair has been efficiently performed, while in the others some faults of technic have rendered it inefficient.

One thing, however, is undeniable, viz., that no matter what other operative technic is employed, if success is to be assured, it must be supplemented by a thorough repair of both anterior and posterior vaginal walls.

A fourth undertaking for the retention of the uterine part of this hernia, viz., shortening of the uterosacral ligaments through a posterior colpotomy, has this to recommend it, that it deals with the only single ligamentous support of the uterus which, under ordinary conditions, directly opposes the descent of the uterus, and the shortening of which produces a sufficient degree of anteversion of that organ to bring the intraabdominal pressure upon its posterior surface and so tend to prevent descent by keeping it out of the pelvic axis.

Inasmuch, however, as pathologic shortening of these ligaments, as by an inflammatory process, is a cause of pelvic pain, the question arises whether artificial shortening of the uterosacrals may not also lead to an ultimate painful condition.

A brief reference to uterine extirpation accompanied by narrowing of the vagina and attachment of the inner vaginal end to the broad ligament stumps completes the list of operative types for this condition, although their many modifications far out-number the parent types.

Vaginal hysterectomy, with support of the bladder upon the broad ligaments brought across beneath it and extreme narrowing or even complete closure of the vagina, especially the latter, is a very satisfactory procedure in senile cases of major pelvic hernia where further function of the vagina is a negligible factor; but vaginal hysterectomy without such a radical supplement is likely to result in recurrent prolapse of the vaginal walls, together with bladder and rectum, while, of course, hysterectomy prior to the menopause is only allow-

able when some diseased condition of the uterus so complicates the hernia as to make removal of that organ independently advisable.

If one may assume from this brief review of the various forms of operative treatment of major pelvic hernia that the problem remains without a thoroughly satisfactory solution as tested by the basic principles that we have ventured to lay down, is there possibly some combination or variation of them which will meet the requirements—a standard, perhaps, that will result in as great freedom as possible from recurrence, that will not materially alter normal anatomical relations, that will not interfere with functional activities and will not create painful conditions?

In the opinion of the writer, all this may be accomplished by first restoring efficiently the normal perineal support of the rectum, and indirectly of the uterus, from below after an amputation of the cervix and by a well-adapted shortening of the round ligaments, after an advancement of the lower bladder wall well up on the anterior face of the uterus in order to take up the cystocele.

Inasmuch as the advancement of the lower wall of the bladder well on to the anterior surface of the uterus without pronounced anteversion of that organ can best be done from above and before the round ligaments are shortened, that portion of the technic should naturally be accomplished first, through a low median incision separating the inner fibers of one or the other rectus. The technic is simple, consisting of division of the peritoneum in the uterovesical sulcus and a blunt dissection of the bladder from the cervix down to the vaginal junction and then likewise for a sufficient distance from the anterior vaginal wall to enable one, by lifting the bladder thus freed, to eliminate the cystocele, which will be determined by an assistant with a finger in the vagina.

After this has been accomplished the denuded surface of the bladder is attached to the anterior uterine wall by buried chromic gut sutures so that its upper edge, corresponding to what was the vesicouterine sulcus, is carried well up toward the fundus. In separating the bladder care should naturally be taken not to go far enough laterally to disturb the ureters.

In deciding on a method for supporting the uterus by means of shortened round ligaments, the choice naturally falls on the Gilliam method or some modification of it. The Baldy-Webster would be out of the question as it only straightens up without materially elevating the uterus and, moreover, uses the weaker end of the ligament for support. A well-executed Alexander would probably be efficient as both it and the Gilliam suspend the uterus well up by the

strong muscular ends of the round ligaments. Inasmuch, however, as the abdomen has already been opened for the bladder advancement, the Gilliam is the natural method to adopt at that stage of affairs.

While the round ligaments, before shortening, are admittedly not an actual support of the uterus against descent, at any rate until the organ is well down to the pelvic outlet, the properly and adequately shortened ligaments furnish an admirable support not only by their actual tensile strength at their inner ends but when reduced, as by the Gilliam technic, they hold the uterus in sufficient anteversion to keep it well out of the pelvic axis and so to prevent its again herniating.

Obviously, if an amputation of the cervix is to be done, it should precede the suspension of the uterus and bladder to insure easy access.

The perineal repair may either precede or follow the suspension. The cystocele being obliterated by the bladder advancement, an anterior colporrhaphy will rarely, if ever, be necessary, unless possibly in some cases to remove redundant mucosa.

If, in certain senile cases, there be marked atrophy of the round ligaments, an abdominal fixation of the fundus may be added to the Gilliam suspension for further security.

Whenever uterine disease accompanying this form of hernia indicates a hysterectomy, it would seem preferable to perform this through an abdominal incision; then to unite the broad ligaments and vaginal stump, after which the bladder should be separated from the upper vagina, bringing it up and attaching it to the transverse shelf or septum thus formed much in the manner in which it otherwise would be attached to the uterus in order to overcome the cystocele. This blending of the bladder, vagina and broad ligaments will more strongly oppose future descent than where such an amalgamation is not effected.

It will be recognized that this procedure bears a close resemblance to that practised by Goffe, except that Goffe's method is entirely vaginal—even to the shortening of the round ligaments, which consequently are not made to materially elevate the uterus.

The bladder advancement by the upper route has also been suggested by Rector, but he supplements this by an abdominal fixation of the fundus, instead of a suspension and so falls short of the object sought by the writer of providing a technic that will not prohibit pregnancy.

This technic is offered in the belief that it conforms to the various

requirements of approximately preserving anatomical positions and relations of the important organs concerned; of not interfering with any physiological functions; of providing, as far as possible, without violating these two conditions, against recurrence and of causing no troublesome sequelæ.

62 MADISON AVENUE.

ANATOMY OF THE FEMALE PELVIS AND ITS BEARING ON PROCIDENTIA.¹

BY

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I HAVE heard Dr. Mayo say that "Every good thing in surgery has been done before and for that matter every fool thing so that it is almost impossible to devise any new procedure." I have no intention of bringing upon my head too severe a storm of criticism by attempting to discuss or recommend any one kind of operative procedure for pelvic displacements. I want only to bring before you a method, that I hope is new, of demonstrating to you and later to medical students some of the factors involved in pelvic surgery with which you are already all familiar—the anatomy of the female pelvis and the conditions and corrections of pelvic injuries and displacements as illustrated by direct color photography. I shall briefly discuss the impressions and conclusions that the work so far done has produced, but only those that I feel I can demonstrate to you in connection with the subject of pelvic prolapse. I am less reluctant in bringing this fruitful subject of debate forward because it has fallen to my lot even on the Pacific coast to see some of the acknowledged failures of eastern operators.

The anatomy of the female pelvis has been very thoroughly worked out by the anatomist in the dissecting room from the anatomical standpoint, but with less regard to the mechanics of the pelvis and the requirements of the surgeon. If we are able to judge from the literature on pelvic surgery, we find that the anatomical conclusions of the surgeons are not always in conformity with those of the dissecting-room workers. The statement has been made that the advance of surgery is going to necessitate the rewriting of our text-books on anatomy to conform with this knowledge. Such a statement,

¹ Read before the Twenty-sixth Annual Meeting of the American Association of Obstetricians and Gynecologists at Providence, Rhode Island, September 16-18, 1913.

however, is perhaps a little extreme; yet a careful review of the anatomy in the dissecting room will help us as surgeons to understand better the requirements underlying our work.

There are so many contradictory anatomical claims made by surgeons regarding the pelvic outlet that a beginner is at a loss which to believe. A statement one often reads tells us that the fibers of the levator ani running between the vagina and rectum are few and the greater number go behind the rectum. Again, that when we pick up the lateral muscles for union in a modern perineorrhaphy, we are in reality bringing into apposition fibers which should normally run behind the rectum. The transversus perinei are often accounted to be of no support value. Many harp on the fasciæ as being the important supports and that it is impossible to separate them from the muscles. These claims I hope to prove incorrect.

Such variance of opinion is probably due to the fact that the surgeon deals with the injured perineum and fascial layers in which the normal structures are distorted by scar tissue and retraction and which are probably atrophic from nonuse. As he has little opportunity to work out for himself the uninjured pelvis, he consequently gets a distorted idea of the normal conditions. I want to demonstrate to you the anatomy of the uninjured female pelvis not because I imagine you are unacquainted with it, but because from many of you as teachers I shall appreciate a criticism of the method used.

In this particular subject there are a few strands of muscle tissue between the superior and inferior layers of the superficial fascia. On the removal of the inferior layer or Collis' fascia, we find the ischiocavernosus or erector clitoridis and the bulbocavernosus or so-called sphincter vaginæ running from the attachments on the central tendon and ischium bony origin, forward around the vaginal outlet and vestibule over the clitoris helping to form the prepuce, etc. I do not propose to take your time by detailed descriptions already known to you. You can see how these muscles are not always of uniform size, neither have they very marked muscle bodies, but are of a sheath-like character except just around the vaginal orifice where there is a bigger sling.

The superficial transversus perinei also vary greatly in size and even in the same subject on opposite sides, but I rather believe that where the superficial muscle is small the deep muscle compensates. In this particular subject the deep transversus perinei on the left side has a large well-defined body, whereas the superficial is rather small. On the right side both are of considerable size, and the common statement that the transversus perinei are of little

surgical value would in this case be far from the truth. I wish, too, that you would notice the point of origin of these transverse perineal muscles from the bone, for it may strike you as it has me that the origin is further anterior than you expected. Perhaps you can see the impossibility in this subject of separating the central tendon origins from each other and later I will show you how the anterior portion of the levator ani also blends in with all these superficial muscles. It is the blending of the muscles in the central tendon that helps form the depression that is known as the fossa navicularis when the superficial movable structures are put on the stretch.

The common statement made regarding the levator ani is that the majority of the fibers go behind the rectum forming for that a sling and we are given to understand that so few fibers go between the vagina and rectum that they are of little surgical value and what we really do when we pick up the muscles in perineal repair, is to pull in some of the fibers that should run behind the rectum. I hope to show to your satisfaction how erroneous such a statement is. We are again told that it is not the muscles but the fascia that we get and that we cannot individually identify the muscle. Others, and I myself, have taught and written that if we get the fascia we get the muscle. In a way that is true, but here you see what a generous body of muscle fibers are bunched between the vagina and rectum, and I will show you later that while the fascia coverings are there, they are of the nature of a sliding shelf and one can pull out the fascia without getting the muscle; though in perineal injuries the scar tissue has made them as a rule adherent, so it is true that if you get the fascia, you get the muscle. What we really get in picking up the tissue from the side then is not the rectal sling of levator ani and coccygeus, but the true vaginal sling retracted back into scar tissue. The rectal sling proportionately to the vaginal has more muscle fibers, but these are spread over a much greater area making the muscle strength uniform. The surgeon who punctures with a sharp scissors pierces no fascia layers (provided he goes in the right direction), but only the scar-tissue formation. In picking up his muscle he brings in not only the levator, but attached thereto all the lateral muscles having their origin in the central tendon, and if he will make that grasp broad enough in the anterior-posterior direction, the transversus perinei will be reached and will be of exceeding support value. Here you can see of what marked development is this musculature in this anterior section of the levator ani, and, again, how the fibers run into the lateral walls of the vagina itself tending to prevent vaginal prolapse and favor cystocele and rectocele in pelvic injury, for

with the rending of the muscle we get the strain on the fascias which of course stretch.

The statement is often made that the reflection of the rectovesical fascia between the urethra and vagina is of little value in repairing cystocele or that between the vagina and rectum in posterior colporrhaphy. You here see what well-defined layers they really are and how their lateral attachments are strong, so, though they may be exceedingly thin in your cystocele and rectocele, you cannot afford to neglect them in repair work, especially at the lateral origins. The physiological facts, too frequently overlooked, give us rational grounds for our plastic work—that muscle tissue develops with use, after recuperation with rest, whereas fascia recuperates only with rest. The two are always associated where stress occurs, the fascia to prevent the overstretching of the muscle, the muscle to prevent the overstrain and allow recuperation of the fascia. And consequently, you will find a properly repaired perineum upon which there is no continued tension from a prolapsing of upper structures gaining in strength and size as time passes.

The deep muscles, those between the layers of the triangular ligament, are much better defined. By that I mean that there are well-developed muscle bellies and the fibers are not spread over as great an area. These anterior muscles are called by Piersol the urogenital sphincter, but if they are always as individual, it would be better that they should be known independently as the constrictor vaginæ and the compressor urethræ of other writers. The deep transversus perinei are as large as the superficial and are of such size that the surgeon's statement of their being of little value is not well made.

Now we reach the shelf of fascia around the cervix and at the base of the broad ligament, and here is where I believe there has been marked injury in those patients who develop prolapsus of the uterus and upper vagina. And as these supports are so well marked in an uninjured pelvis does it not seem more reasonable to use some type of operation which will correct the relaxation here?

I am not going to discuss the mechanism that keeps a normal uterus in position. You all have your own ideas. But I will venture to suggest that possibly the infundibulopelvic ligament has more to do with this mechanism than it is usually given credit for. You can see in these slides the comparatively large amount of muscle tissue helping to compose it. The sacrouterine ligaments are also well defined.

Now as to the injured perineum. Here is a case of marked recto-

cele with the central tendon intact. I shall show you quickly how the muscles have retracted into scar tissue and the resultant distorted relation of the lateral structures.

I want you to note how strong and well defined are the anterior edges of the triangular ligament and how well the urethra is attached under the pubic arch. A little later I will show you what an exceptionally large suspensory ligament of the clitoris we have in this particular subject.

In May, 1911, I read a paper before our local society on the subject of "The Principles Underlying the Cause and Treatment of Retro-displacements" in which I attempted to express in an as attractive way as possible to the general practitioner the ideas that the reading and teaching of the subject had given me. A little later I came upon a paper with somewhat the same trend of thought but giving the sympathetic nervous system the blame. Still later an article by Goffe expresses in a better way than my paper the principle that always seemed to me of most vital importance. I then thought with the "Kelly dictum" that retroversion was a first stage in prolapse and that the injured pelvic diaphragm was at fault. While the injured diaphragm is always a contributing factor and a repair is absolutely essential for a cure, as a conclusion based on these dissections I now feel that injury to the supporting layers above the true pelvic diaphragm has to be present and, this being so, it places the causation of prolapse in a distinct class from retroversion. Retroversion is bound from the nature of the mechanics to be a primary stage of prolapse, but prolapse should not always be considered as a result of retroversion.

In these illustrations you can see that contrary to the statements of Dickinson in "Genital Prolapse," 1910, and others the vagina is upheld laterally throughout practically its whole length by first, the fibers from the levator ani and superficial muscles, and above that by the reflection of rectovesical fascia in which are some muscle fibers.

This article of Dickinson deals with the study of cleavage lines and prolapse conditions occurring as slides along these cleavage lines as faults. The loose attachment of the rectovesical fascia to the muscle sling posterior to the rectum would tend to favor just such a slide. To get a slide of the bladder and urethra under the pubic arch would, however, necessitate extensive injury and I can hardly imagine injury excessive enough to cause the same thing in the "rectoanal" segment without a tearing through of the levator and coccygeal sling, for the anal fascia is pretty closely woven into

the muscle fibers. Between the urethra and vagina the conditions ought to produce a ptosis of the whole septum or a hernia through the fascia rather than a slide of the vaginal wall on the fascia.

You will all agree with me when I say that the vast majority of prolapse cases in whatever degree or form are the sequel of childbirth. And with Dr. Tracy you will also agree when he says that thorough plastic work is most essential to obtain good results, but that even thorough plastic work will be followed by a large per cent. of failures if the uterus is not maintained in normal anterior position.

Lathrop writes that prolapse occurs first as a result of weakening of the uterine ligament, and second, through weakening of the pelvic floor. Few writers emphasize the weakening of the cervical sling.

In most cases of prolapse the cystocele is the most difficult condition to correct. The greater number of prolapse operations are devised to permanently cure that condition. I do not attempt to discuss the relative value of hysterectomy as compared with the interposition operation. The Watkins operation, according to Tracy and Mayo, is followed by from 2 to 32 per cent. of failures. Are not the failures due to the fact that we are in this Watkins' procedure depending for support from above only on the twisting and thus the relative shortening of the broad ligaments. If the fundus of the uterus is hung high enough to rest against the symphysis pubes and the body is not too long to force it down, it will stay. If it hangs low, on account of a too relaxed broad ligament, provided it is big enough to straddle the pubic arch, it will remain.

When sufficient atrophy takes place, it then protrudes to the point where the upper supports become "on tension," for as you all know, any lower support, no matter how adequate, will give in time to continued pressure.

Polk in his suprapubic operation on the pelvic floor, McCann of London in his extensive resection of the vaginal vault, and Somers of San Francisco in his application of the detached sacrouterine ligaments in front of the cervix, attempt to make use of the supports at the cervical plane and yet retain the uterus. If we feel the necessity of retaining the uterus, why not make an application of either Somers' or McCann's method and then also do as Goffe advises—shorten the round ligament in front of the transposed fundus being careful to reattach the distal loop at the normal origin to prevent an abnormal plane formation. Thus we should get the whole uterus slung high in the pelvis and in an anterior position. If we want to conserve child-bearing, the bladder could be left below, but then we

are open to the criticism I have made against the anterior plication operations of Willis and Goffe from the standpoint of bladder interference and infection.

I will now show you some slides as a means of illustrating and emphasizing the possibility of extensive perineal relaxation without mucous membrane tears, as well as the rather infrequent occurrence of true rectocele in prolapse cases due to the fact that the rectum being restrained from coming down by its upward continuation is supported as by a splint by the uterine body.

The ease of picking up the muscle sling in perineal repairs and the ability to differentiate it I think is also well shown in these color photographs. The simple operations of cervical repair and amputation as well as the demonstration of relaxed vaginal outlets are more readily shown than by black and white photographs and we eliminate the personal equation introduced by the draftsman.

BLOCKING THE SYMPATHETIC BY A METHOD OTHER
THAN SPINAL ANESTHESIA TO PREVENT SHOCK IN
THE COMBINED OPERATION FOR CANCER OF
THE RECTUM OR RECTO-SIGMOIDAL JUNC-
TURE, WITH SOME IMPROVEMENTS AND
MODIFICATIONS OF TECHNIC.¹

BY

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For some time we have needed a method by which shock could be minimized, or prevented, in the combined operation for cancer of the rectum. We believe that the high mortality associated with this operation, especially in men, could be almost entirely eliminated if an easy and simple method of blocking, not entailing great delay, could be found.

It is self-evident that spinal anesthesia should accomplish this, but the writer, for one, has never felt that this method was free from danger—even when used by those most familiar with its technic. Furthermore, this particular method is not always suited to the combined operation, because of the different positions in which the patient has to be placed in order to complete the operation with ease and comfort.

¹ Read before the Twenty-sixth Annual Meeting of the American Association of Obstetricians and Gynecologists at Providence, Rhode Island, September 16-18, 1913.

We are not unmindful of the fact that the specific gravity of an anesthetic can be so increased as to make it hypertonic, or, in other words, heavier than the spinal fluid, which is about 1.007-1.008; but at the same time, so far as we have been able to observe, there is always a certain amount of shock accompanying an injection of any fluid into the subarachnoid space. As we have already shown in a previous article, there is always the danger of disturbance of pressure with cessation of respiration.

Through the kind permission of Professor Stockard, and his associate, Dr. Burrows, the writer had an opportunity of studying some excellent dissections of the sympathetic, together with dissections of the spinal cord, and from these studies, we have evolved a very simple plan of blocking the sympathetic, which will be, so far as we can judge from a limited experience, of inestimable value in preventing shock in the combined operation for cancer of the recum or rectosigmoidal juncture. Furthermore, we have so improved the technic as to make the operation much easier and safer and, while the procedure we are about to describe requires surgical dexterity and judgment, yet it is so simplified that very much less time is necessary for its accomplishment, and the danger from hemorrhage has been almost entirely eliminated.

The patient, after having been prepared for operation in the usual manner, is given 1/4 gr. morphin and 1/200 gr. hyoscin, unless for some reason this is contraindicated, and is then placed in the left Sims position. The spine of the sacrum is usually bifid, and does not reach within an inch of the sacrococcygeal joint. Under such circumstances the insertion of the needle is a comparatively easy matter. In other cases the opening is close to the sacrococcygeal joint, and the safest plan to follow, then, is to locate this joint and, inserting the needle at this point, follow the bone closely, when the needle is bound to enter the sacral canal. One can easily tell if the needle has entered the sacral canal by moving it back and forth, when the bony structure will be felt if the needle is in the canal; if it is not, the needle will be readily felt under the skin. Of course, in a very fat subject, it is possible to make an error; but even under these circumstances, it can be demonstrated that the needle is in the canal by bending the outer portion inward and trying to pass the point through the skin, when, if under the skin, it will pass out, and if in the canal it cannot pass out. If the needle is very long, however, and is passed to one side, it is quite possible to pass it through the skin above the crest of the ilium.

The safest method to adopt, especially by those who are not very

familiar with this procedure, is to make an incision a little in front of the sacrococcygeal joint, and, if necessary, extend it until an opening is found. This can be done under local anesthesia.

The point at which the needle is to be inserted is first decided upon. This can be determined by following the sacral spinous processes until they are found lacking. Slightly above this point will be found the opening of the canal. If, as happens in most cases, we have a bifid spine, the ridges can be easily felt, except in very fat subjects. If the canal opens near the sacrococcygeal joint this point is selected. Then, having first determined the point at which the needle is to be inserted, and this is always in the median line, it is painted with tincture of iodine. Next, a little ethyl chloride is sprayed on the skin and a hypodermic syringe, containing a solution of 1/500 cocaine, with an ordinary hypodermic needle, is employed in order to anesthetize the skin over the area in which the needle is to be inserted, so that a small incision can be made without causing any pain. It is always better to incise the skin in order to obviate any chance of infection.

The following procedure is used in passing the needle: The needle is grasped in the right hand, and the index-finger placed close to the point. It is then passed at an angle of about 15° until the bone is reached. The needle is then passed close to the bone until it has been entirely inserted for about 1 inch. At this juncture, it is well to pause and determine whether the needle is in the canal or not. This can be determined, as we said before, by moving the needle back and forth, up and down, and from side to side. If it is in the canal, the wall will be found on all sides, and if not the needle will pass readily through the skin.

When the needle is found to be in the canal, about 4 c.c. of the same solution is deposited on each side. This is usually sufficient.

After this has been done the trocar is reinserted in order to prevent the escape of fluid, and the needle, with the trocar, allowed to remain in position until anesthesia is established. The reason for this is because if the anesthesia is not established after fifteen minutes, it may be necessary to inject 1 or 2 c.c. more, and this is made much simpler if the needle has been left in place.

It is important for the fluid to be absolutely sterile and freshly prepared; also of the same specific gravity as the blood in order that it may be readily absorbed.

After this has been accomplished, the patient is placed in the lithotomy position, and the abdomen painted with tincture of iodine, this afterward being washed off with alcohol. The object of this is

to prevent any irritation of the peritoneum from the iodine; some cases of chemical peritonitis having been reported by our friends.

The abdomen is then opened by a median incision, and a self-retaining retractor placed in position. The patient is put in the Trendelenburg position, and the small intestines carefully walled off with one large pad about the size of an ordinary towel. We prefer this to a number of smaller pads, and it has worked very well so far. When the small intestines have been thoroughly packed off, the patient can be returned to the prone position, if it is deemed advisable.

The next step is to block off all the sympathetic nerves within the triangular space bounded by the common iliac. The needle used for this purpose is about 2 inches long, curved on the flat, and has a probe point, the object of this point being to prevent perforation of the iliac veins. The technic is as follows: An incision is made in the mesentery on one side at the apex of the common iliac arteries, slightly above the bifurcation of the aorta. The needle is passed in through this incision, and all the space between these arteries is infiltrated with a solution of 1 per cent. novocain. If necessary, the inferior mesenteric plexus can also be treated in the same manner. After this has been accomplished, the sympathetic nervous system of the entire hypogastric plexus is blocked. Now, by means of a scissors curved on the flat, the right mesosigmoid is slit as far down as the bladder, or uterus, as the case may be, and continued around on the anterior surface of the rectum to the other side, thus separating the rectum from the bladder or uterus. The right leaf of the mesosigmoid is treated in the same manner. When this has been done, the sigmoidal artery is double tied close to its root. Afterward, the superior hemorrhoidal artery is double tied, and the surgeon, with a scissors curved on the flat, proceeds to scoop out all the fat and glands between the folds of the proximal mesosigmoid. This scooping process continues from the promontory of the sacrum to the levator ani muscle. After the middle hemorrhoidal artery, which is a branch of the obturator, has been clamped, both leaves of the mesentery are cut, and this cutting process is carried down to the levator ani muscle. The rectum can now be readily separated from the prostate and urethra as far down as the levator ani muscle. The tumor and sigmoid are then packed down in the pelvis, and the peritoneum dissected up from the side of the pelvis and attached to the bowel, thus making a new diaphragm about 2 inches higher than the former peritoneal attachment. All raw surfaces are covered by attaching the peritoneum to the gut, either by a continuous cat-

gut suture, or by several interrupted sutures, and the abdomen closed in the usual manner. This entire procedure should not occupy more than thirty minutes.

After the abdomen has been closed, the patient is placed in the lithotomy position, and an incision made, beginning about $1\frac{1}{4}$ inch back of the posterior commissure, to the sacrococcygeal joint. The levator ani muscle is then perforated by means of a scissors. One of two procedures may then be followed: The gut can be pulled through the levator ani muscle posterior to the anus and the tumor removed, after which both ends of the gut are treated with carbolic acid, and the proximal end, with the distal, invaginated through the anus, and an end-to-end anastomosis made. Or, and we prefer this method, the mucous membrane may be dissected from the anus, just as is done in the Whitehead operation, and the dissection continued until the bowel is thoroughly freed. The bowel and tumor are then pulled through the anus, the tumor removed, and the gut sutured to the skin. A drainage tube is then placed in the hollow of the sacrum and packed around with iodoform gauze. The posterior incision is then closed by means of interrupted silkworm-gut sutures, thus completing the operation.

This operation can be done at one sitting, or in two stages, depending upon the condition of the patient and the rapidity with which the operator can work.

57 EAST FIFTY-SECOND STREET.

PUBIOTOMY VERSUS CESAREAN SECTION IN NEGLECTED CASES.¹

BY

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My object in bringing this subject before you is mainly influenced by the existence of a great difference of opinion among competent obstetricians as to the mode of procedure in a given case of dystocia due to disproportion of the size of fetal head and the pelvis in which attempt at delivery was made by the general practitioner, or in cases of labor in which asepsis and antisepsis were not scrupulously observed.

A great deal of the work of the consulting obstetrician belongs to this class of cases. The average practitioner in the city or

¹ Read before the Twenty-sixth Annual Meeting of the American Association of Obstetricians and Gynecologists at Providence, Rhode Island, September 16-18, 1913.

country has as yet not acquired the knowledge necessary to establish a diagnosis of relative disproportion of the fetal head to the pelvis. This is particularly true in multiparæ who have had previous spontaneous births. The fact that the difference in weight in children may be as much as 5 or 6 pounds and often more, and may cause the greatest amount of dystocia, is but seldom taken into consideration.

In reviewing the literature of obstetrics of the past ten years one is impressed with the fact that hardly anything new has been brought forth during this time. The only advance made has been in the establishment of certain operative procedures in given cases of dystocia. But with the advance of the operative technic, the application of the same has not been, so to say, "standardized," which is very essential for the successful development of any particular operative procedure, in order to obtain the minimum amount of morbidity and mortality.

It is, therefore, apparent why I choose to call the attention of this association to one of the mooted questions in obstetrics of to-day, with the hope that a full discussion of the same will bring forth a consensus of opinion as to the proper method of procedure.

We have at our command three methods of delivery of a living child; first, high forceps; second, Cesarean section; third, pubiotomy.

Delivery by high forceps was justifiable in the days when obstetrical surgery was not fully developed. Then asepsis and antisepsis were not well understood, and it was a life-saving procedure for the mother, for if she were not relieved she would have died from exhaustion and sepsis. In the light of our present knowledge, it is hardly justifiable, especially so in primiparæ. We know of no other surgical measure where the same principles are carried out. We know of no procedure in surgery where it is attempted to pull through a fetal head of distinctly greater dimensions than those of the cavity. If such an emergency arises in the course of an operation, either the opening is enlarged or the mass is made smaller; mere force as a means of accomplishing it is never brought into play, and no surgeon would ever countenance its use.

To practise modern obstetrics, three cardinal principles must be kept constantly in mind before treatment of a given case of dystocia is undertaken: *First*, the effect of the operation upon the mother; *second*, the effect upon the child; *third*, the operation from a purely technical and surgical standpoint.

In the study of the high-forceps operation we fail to find any of the above principles considered; its effect upon the mother is

familiar to all who do it, the injury to the lower segment of the uterus is well known; next to version, the uterus is more frequently ruptured or perforated by the forceps during this mode of delivery than during any other obstetrical procedure. The injury to the vaginal vault is often so extensive that an attempt at repair is futile.

Practically speaking, all the plastic operations on the vagina are made necessary through childbirth. If obstetrics is practised scientifically, the more extensive lacerations may be avoided. But if it is practised indifferently, the result is that our gynecological clinics become filled with suffering womanhood.

The effect of high forceps on the child is too well known and hardly needs discussion. A great number are stillborn; others, while delivered alive, survive but a few hours or days. They usually die either from a fractured skull or from intracranial hemorrhage produced by the compression of the blades. It is difficult to estimate the actual fetal mortality caused by the high-forceps delivery as the majority of these operations are performed in private dwellings. Our health boards do not require a proper and scientific classification as to the cause of death. As a rule, the vague statement of "forceps" or "instruments" is sufficient. No attempt is made to find out the kind of forceps that were used; whether high, medium or low, and, therefore, nothing could be gained by inspecting the vital statistics.

In order to place the subject of the paper in a concrete form and that it should be of practical value, I would formulate the following questions:

How should we proceed to deliver a given case of dystocia due to relative disproportion of the fetal head and pelvis which has been in labor twenty-four hours or longer, with cervix dilated or dilatable, in charge of the family physician or midwife, who has been examined frequently, or after forceps were applied and failed, the child still viable and sepsis and antisepsis not strictly observed?

Should we presuppose infection in these patients and is delivery to be accomplished by pubiotomy, or is the question of infection not to be considered and the abdominal route to be adopted?

I realize the difficulty of a proper solution to this question, but as all problems are solved by past experience, I hope the personal observation of the members of this association will decide this question either one way or the other.

I do not want to be misunderstood, that I am attempting to place the pubiotomy operation in competition with Cesarean section or

vice versa. I am certain that this is the only class of cases in which either operation may be performed, depending upon the view the operator takes on the question of infection. I always considered pubiotomy as an operation of emergency, not of election. To deny this operation its usefulness in properly selected cases would be a great loss to obstetrical surgery and the probable loss of a great number of patients. An operation that has been performed over 1000 times by a great number of competent obstetricians must not be dismissed lightly. It is only a question of establishing definite indications for its performance.

I believe that pubiotomy is the only operation in border-line cases that have been mismanaged or misjudged. It adds but little additional risk to the mother. The patient, however, should always have a strong test of labor. The head should be somewhat engaged and forceps should have been attempted, and if then the child is still alive, pubiotomy should be performed.

The technic of Döderlein has been followed. If the patient is a primipara, I perform an episiotomy on the opposite side so as to facilitate delivery and also to prevent a communicating tear of the vagina and pubiotomy wound. No attempt is made to unite the cut ends of the bone. The separation of the ends obtained in my cases was $3/4$ inch in some cases and over 2 inches in others.

My experience with this operation consists of nine cases, and I shall here give in detail a report of same:

CASE I.—Mrs. B. B. Russian, aged twenty-five, primipara, last menstruation January 15, 1911, came to engage me in the sixth month of pregnancy. On examination the diagnosis of just minor pelvis was established. The pelvic measurements were, interspinous, 24; intercrystal, 26; external conjugate, 21; diagonal conjugate, 10. She was put on Prowchnic's diet and instructed to call every two weeks for observation, and was advised to have labor induced in the thirty-seventh week, but refused.

Labor pains began about 5 P. M., October 12. She was admitted to the Jewish Maternity Hospital about 8.30 A. M., having strong pains every fifteen to twenty minutes. On examination, at 10 A. M., the cervix was dilated two fingers, and the membranes ruptured. At 5 P. M., the cervix was two-thirds dilated and the head in first position, attempting to engage. The pains at this time were very strong and almost continuous, the uterus almost in a tonic state of contraction. Morphin was given hypodermically and patient rested for about two hours. At 9 P. M., the cervix was fully dilated, the head still high in the pelvis. At midnight another dose of morphin was given, hoping that a short interval of rest would bring out more forcible uterine contractions, but with no effect whatsoever. At 3.30 A. M., after the cervix was fully dilated for six hours, the

pains occurring every two to five minutes and the fetal heart suddenly becoming weaker, immediate delivery by pubiotomy was decided upon and a living child weighing 6 $\frac{1}{2}$ pounds was extracted.

There were no complications during the operation and delivery. Bleeding from the wound was very slight. The vagina was packed as a routine measure. The separation between the cut ends of the bone was about 2 cm. The wound was dressed and a strip of adhesive plaster across the pelvis applied to prevent any undue motion and separation of the cut ends of the bone.

Convalescence was normal. The patient was out of bed on the fifteenth day, and mother and child left the hospital on the eighteenth day. There was no difficulty whatever in walking. The fetal measurements were as follows: Length, 50; suboccipitobregmatic, 32; occipitomentale, 13; occipitofrontal, 11.

The reason delivery by forceps was not tried at first in this case was mainly on account of the sudden change in the fetal heart. I feared that the additional injury to the child would possibly cause it to be stillborn.

CASE II.—Mrs. F. K., patient of Dr. W. Naring, primipara, commenced to have labor pains Thursday, October 12. The pains were irregular and weak, but Friday became stronger. At 4 A. M. Saturday, the cervix was fully dilated; at 9 A. M., after five hours of active labor pains and no progress, artificial delivery by forceps was decided upon. After moderate pulling by the attending physicians, no progress was made. At this juncture I was summoned to see the patient. On examination the cervix was found fully dilated, the head in the left occipitoanterior position wedged in at the inlet, the fetal heart good, the mother beginning to show signs of exhaustion. I attempted to deliver her with forceps, but after a trial of about ten minutes it became evident that it could not be effected. The fetal heart sounds still being good, I suggested that the only possible method of delivering a living child was by pubiotomy. The family physician having concurred, the patient was transferred to the Jewish Maternity Hospital. Pubiotomy was performed and a living child weighing 8 pounds 4 ounces was delivered.

The measurements were as follows: Mother, interspinous, 21.5; intercrystal, 26; external oblique, 20.5; external conjugate, 19.5; diagonal conjugate 10. Child, biparietal, 9.5; suboccipitobregmatic, 9.5; suboccipitobregmatic circumference, 34; occipitofrontal, 35; length, 52.

The patient underwent a mild febrile convalescence, but was out of bed on the seventeenth day, and mother and baby left the hospital at the end of three weeks.

CASE III.—Mrs. C. S., patient of Dr. I. I. Bernstein, twenty-eight years old, para-ii. First labor, three and one-half years before, normal; the child weighing 5 $\frac{1}{2}$ pounds (mother's statement). The membranes ruptured November 3, at 6 P. M., one hour later labor pains set in which lasted during the night. The face was presenting. At 8 P. M., after the cervix was fully dilated, delivery

by forceps was attempted, but they slipped. A few more applications were made, but with the same result. At this time I was asked to see the patient.

On examination I found the cervix fully dilated, but beginning to be edematous, the face presenting in the transverse diameter of the pelvis, the head large and above the brim, but the child still viable. The patient showed signs of exhaustion; pulse 120 to 130, temperature 101° F. She was transferred to the Jewish Maternity Hospital for pubic section. A living child, weighing 8 pounds 12 ounces, was delivered. It was evident that the head and neck of the child were severely injured by the many applications of the forceps.

The puerperium ran a septic course, the temperature ranging between 102 and 106° F. for fourteen days. The patient finally began to improve and was discharged from the hospital at the end of twenty-six days. A large hematoma of the head and neck developed in the child, which died of asphyxia on the fifth day. The patient had a flat pelvis, but not markedly so. The fetal head was rather bony and well developed.

The child's measurements were: Length, 51; occipitofrontal, 36; suboccipitobregmatic circumference, 34; bisacromial, 41; biparietal, 10; suboccipitobregmatic, 9.5; occipitomenal, 13.5; occipitofrontal, 12.5; bisacromial, 13.5.

In this patient it was the overdevelopment of the child that caused the dystocia, as evidenced by the normal course of the previous labor when the child was small.

CASE IV.—Pubiotomy. Mrs. A. S., patient of Dr. L. Ritter, aged thirty-four, para-i. Patient began to have labor pains on January 3, which were rather irregular and weak. During the 4th, the membranes ruptured. On the same day about 8 P. M., pains became stronger and more frequent. The breech was presenting and the cervix was fully dilated. January 5, during the entire day, notwithstanding the strong pains she had, there was very little progress. Patient began to show signs of exhaustion toward evening, the pulse rose from 120 to 130, the temperature 101°.

I was asked to see patient about 8 P. M. of the same evening, and on examination I found the breech presenting, the child rather large; the pelvis was contracted and of the justminor type; diagonal conjugate measured 10 cm. plus. It was evident from external examination that the child was large and out of proportion to the pelvis. The fetal heart sounds were good. The chances of delivering a living child under these conditions were apparently improbable. In the interest of the child pubiotomy was suggested as the method of procedure, and with but little additional risk to the mother. The attending physician and the family concurring, the patient was removed to the Jewish Maternity Hospital. The patient was prepared for delivery and a Gigli saw introduced as a prophylactic measure, and the legs of the child brought down. It was very evident from the appearance of the lower extremities that the child was large and well developed and that extraction through a contracted

pelvis was impossible. The fetal heart still being good, pubic section was performed, and a living child, weighing 8 pounds 10 1/2 ounces, was delivered.

The separation of the cut ends of the bones was almost 2 inches, giving just sufficient space to deliver the head. The child was born asphyxiated, but was finally resuscitated at the end of one-half hour.

Mother and baby were out of the hospital at the end of twenty-six days.

CASE V.—A. C., aged twenty-three, para-ii. First labor instrumental, child alive. Admitted to the hospital April 2, 1912, at 12.45 A. M. Cervix three fingers dilated, head not engaged. Temperature 100°, pulse, 112; respiration, 24. At 4.30 A. M., the cervix was fully dilated, patient had severe pains, but the head did not engage. At 7.30, 1/4 grain of morphin was given; at 9.30 A. M., she was taken to the operating room for delivery. Forceps were applied by Dr. I. S. Tunick, but no progress was made. At 9.30 the forceps were tried by me, but it was evident that the fetal head was too large to pass through and pubic section was decided upon. Delivery was completed with forceps. The separation of the cut edges of the bone was about 3 cm. The child lived four hours and apparently died from injury to the head produced by the forceps. The mother made an uneventful recovery and was discharged April 21.

CASE VI.—Mrs. D. B., patient of Dr. N. O. Ratnoff, aged twenty-five, para-ii. First child delivered by version, stillborn. Admitted to the hospital October 1, 1912, after being in labor twenty-four hours; cervix fully dilated, membranes ruptured. Patient had strong labor pains during the entire day and night, but the head attempted to engage only slightly. October 2, 1 P. M., delivery by forceps was attempted. After a trial by Dr. Ratnoff and myself for about twenty-five minutes no progress was made. The mother was anxious for a living child, so pubic section was decided upon.

The cut edges of the bone separated fully 6 cm., and delivery was accomplished by forceps. The mother and child were discharged from the hospital October 18, both in good condition.

CASE VII.—Mrs. B. F., patient of Dr. M. O. Magid, aged thirty-nine, para-iii. First labor premature in the eighth month, child stillborn. Admitted to the hospital November 11, 1912, at 10.30 A. M., having been in labor nineteen hours. Cervix fully dilated, membranes ruptured; head not engaged. At 11.30 A. M., delivery by forceps was attempted, but no progress was made and in the interest of the child pubiotomy was decided upon. Delivery was accomplished by forceps. The cut edges of the bone separated 3 cm. The mother and child were discharged November 27.

CASE VIII.—Mrs. F., para-ii. First labor instrumental; child died. Second labor gave birth to a premature child.

Was in labor at her home thirty-six hours. Membranes ruptured when cervix was two-thirds dilated. In spite of strong pains, no progress was made. Parents were very anxious for a living child. Patient began to show signs of exhaustion.

I advised her removal to the hospital. At the hospital delivery by forceps was attempted, but no progress could be made, so pubic section was performed in the interest of the child.

Mother and child were discharged from the hospital on twentieth day in good condition.

CASE IX.—Mrs. L., patient of Dr. M. O. Magid, para-vi. All labors difficult. Instrumental deliveries, two children were still-born, one died in the puerperium. Two are alive.

Membranes ruptured at the onset of labor. Patient was in labor forty-eight hours. Pains strong and frequent, but head does not seem to engage. At this stage of labor I was asked to see her and advised her removal to the hospital. Delivery by forceps was attempted, but forceps slipped, so pubic section was performed. With the bone divided and separation of about an inch and a third, it was difficult to extract the child, so the patient was let alone and sent to the ward in the hope that with stronger pain the head would engage. The following morning the child was extracted by forceps.

Patient developed a phlegmasia alba dolens which kept her in the hospital five weeks. Mother and baby were discharged after the local condition subsided.

In turning our attention to the statistics of Cesarean section of various operators, we are impressed practically with this fact; that the mortality and the morbidity are influenced by the number of so-called "unclean cases" that are included in the list. Cesarean section in clean cases should have a small percentage of mortality. It should not be greater than any other clean abdominal operation. By adopting a broader field for abdominal section the consequences are, that not only are many mothers lost, but that the operation in itself is thrown in an unfavorable light, as the profession at large never enters into details of statistics and very often the family physician and through him the relatives will insist upon craniotomy on a fully viable child. The same principle in a lesser degree holds good for the pubiotomy operation. Many obstetricians take the position that a craniotomy should not be performed on a living child. A great number of cases are brought into the hospital in which delivery was attempted by the attending physician with forceps, but failed. On examination fetal heart sounds may be elicited and therefore the child is to be considered viable, but the injury to the fetal head may be such that it will only survive a few hours or days. In such cases pubiotomy should not be considered, but craniotomy is the operation of choice, as pubiotomy is only performed in the interest of the child, and unless the outcome for the child is favorable, otherwise it should never be resorted to.

My experience with abdominal section consists of thirty cases.

In reviewing my series of Cesarean sections, one fact stands out

prominently and that is that nearly all the patients that I have managed personally recovered with a minimum amount of morbidity, while patients who were handled on the outside at their homes and brought into the hospital in an emergency upon whom section was performed, the greatest percentage died from sepsis and other complications. In this series of thirty patients, six died—three from septic peritonitis one patient developed abscesses along the line of suture in the uterus and died on the twelfth day; one developed sepsis and complete anuria and died on the fourth day; and one was an eclamptic with a contracted pelvis; she did not rally and finally died on the third day.

All these patients were attended at their homes before admission to the hospital and were examined quite frequently

We must come to realize that a woman in labor who has been examined frequently or upon whom some manipulation was done, is unlike any other surgical patient and, therefore, should be treated more conservatively. We have no means of ascertaining whether sepsis is already present or when it is liable to develop, and the opening of the peritoneal cavity and the incising of the uterus may be the turning-point to a fatal issue from peritonitis or other complications.

Finally, I wish to state that while my results from pubiotomy were quite favorable, still I feel that it must be performed only in cases where there is no other alternative. It must also be performed very carefully, and if one is not trained in gynecological surgery, it should not be undertaken. The injuries to the soft parts and to the bladder and urethra may be quite extensive. The sacroiliac joint may be injured, and if this possibility is not borne in mind, this will result in permanent disability. Hemorrhage may be profuse and, at times, uncontrollable. Communicating vaginal tears take place in a moderate number of cases. While I did not encounter these complications, still one must be ready to meet and treat them properly. Pubiotomy should never be the operation of choice; it is always one of emergency. In cases that have been misjudged and neglected, with the child still viable, it is the only method of procedure, and only an experienced obstetrician should undertake its performance.

CONCLUSIONS.

1. A close study of statistics of Cesarean sections of various operators compel us to assume that cases which are brought into the hospital with a history of a long and tedious labor, who were

frequently examined or delivery by forceps attempted, are supposedly infected and, therefore, abdominal section should not be the operation of choice.

2. In such cases pubiotomy becomes the operation of necessity, for it adds very little danger to the mother and it saves the child.

3. Pubiotomy is not an operation of election.

4. Cesarean section and pubiotomy never compete. In cases where Cesarean section is indicated, pubiotomy is contraindicated and *vice versa*.

154 HENRY STREET.

UTERINE HEMORRHAGE ASSOCIATED WITH HYPERTROPHY AND SCLEROSIS OF THE UTERINE VESSELS.¹

BY

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AN article(1) appeared in the February number of the AMERICAN JOURNAL OF OBSTETRICS entitled "Metrorrhagia due to Atheroma of the Uterine Vessels." The writer of the article advises that "hysterectomy should be the treatment of these cases, and should be performed before they have advanced so far that very marked arterial changes have occurred."

Some sixty cases, as reported by Fr. Proescher, Pathologist, have come under my observation as assistant in the service of F. Blume, Gynecologist of the Allegheny General Hospital. In our opinion, this vascular condition is neither the specific cause of the bleeding nor should the pathological report of its presence be considered final in determining radical surgical procedure in all cases.

In the May number of the same journal, an article entitled "Surgical Treatment of Uterine Hemorrhage from the Nonpregnant Uterus," (2) makes no reference to sclerosis of the uterine vessels, and, it is merely mentioned, as a condition that may be present, but not definitely associated with hemorrhage, in the discussion of this and other papers read at their symposium on uterine hemorrhage in the Transactions of the Obstetrical Society of Philadelphia.

In view of the careful investigation and discussion given this subject, especially during the past, ten years and, considering the fact that nothing has been found specifically characteristic to account for the bleeding in these cases, I feel that this subject should be kept

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prominently before the profession until more definite information results.

Gardner(3) and Goodall review the salient historical points in the literature on this subject, as follows:

Scanzoni, in 1860, wrote the first scientific article on chronic metritis, associating chronic inflammatory endometritis with chronic metritis.

Seifert, in 1867, claimed that chronic metritis, more properly termed chronic infarct of the uterus, was chiefly due to disturbance of normal puerperal involution of the uterus.

The microscop, then, began to influence investigators, but, due to low power and poor technic, the conclusions were variable and contradictory.

The use of the curet, advocated by Olshausen in 1870, centered investigation on pathological changes in the endometrium as the probable cause of menorrhagia and metrorrhagia.

The development of the study of bacteriology further led scientists to believe septic endometritis to be the cause of chronic metritis.

Fritsch, in 1885, attributed diffuse fibrosis of the uterine wall to prolonged inflammatory reaction.

Cornil, in 1888, writes, "To the naked eye, the muscular tissue is a pale red color, presenting a series of opaque lines which are thickened arterioles in a state of atheromatous degeneration."

Reinicke, in 1897, claimed there was a primary chronic metritis without sign of inflammatory reaction either in the uterine wall or its neighborhood with a perfectly healthy endometrium.

Theilhaber and Meier, in 1902, like Reinicke, referred the hemorrhage to muscular insufficiency of the uterus, as did Palmer Findley, in 1905, in some of his cases.

Certain cases of uterine hemorrhage suffering from menorrhagia, metrorrhagia, or both, intractable to medical treatment, local treatment or curettage, finally come under the care of the gynecologist for definite relief. When the patient has been anesthetized, and the scrapings from the endometrium and pieces of tissue excised from the cervix are submitted to the pathologist for frozen section and microscopical examination, the report sometimes informs us of the existence of marked hypertrophy and sclerosis of the uterine vessels.

The etiology of sclerosis of the uterine vessels, as well as the pathological relation it may have in causing intractable bleeding, are questions not yet satisfactorily answered.

Whether the increase in the connective tissue in the uterine wall or in the vessels is primary or secondary has been questioned,

and, also, whether or not the bleeding is due to the fragility, loss of compressibility, contractility or retractility of the vessels, muscular insufficiency of the uterine wall, condition of the endometrium, functional activity of the ovary or some cause outside of the uterus yet unknown.

We have no method of properly estimating the effect of the ovarian secretion and the condition of the nervous mechanism in regulating blood pressure, the contractility of the muscular fibers, the elasticity of the fibroelastic tissue, and the coagulability of the blood, in considering the value of each in controlling bleeding in these cases.

Reinicke(4) claims that the connective-tissue change in the myometrium is secondary to the arteriosclerosis, owing to defective nutrition, and is not due to inflammatory process, and ascribed the bleeding to vascular change in certain of his cases and to muscular insufficiency of the uterus in others.

Gardner and Goodall claim that the two groups of involuntary muscle, the media of the vessels and the uterine muscle, act together and supplement each other, hypertrophying and undergoing involution after labor, contracting and retracting in the arrest of hemorrhage after labor, and, also, in chronic metritis, the vessels as well as the uterine muscle undergo fibroid changes. They ascribe hemorrhage in these cases to the biological or pathological change in one group of involuntary muscles being the chief cause, and, the other, supplementary.

Solowij and others claim that the vessel change is secondary, compensatory to muscular insufficiency of the uterine wall.

Proescher says, basing his statement on some 200 microscopic examinations of different uteri showing sclerosis of the vessels, that there are cases having no hemorrhage where sclerosis of the uterine vessels is very marked, and other cases associated with serious hemorrhage where there is very slight evidence of these sclerotic changes, and, therefore, that this condition of the vessels is not the cause of the bleeding.

Theilhaber(5) and others attribute the bleeding in these cases to a muscular insufficiency of the uterus brought about by an intermuscular and perivascular development of connective tissue following a diminution of the muscle fibers due to atrophy from overexertion after repeated pregnancies, so that the uterine muscle is unable to spontaneously contract and prevent overcongestion of the endometrium.

Goodall(6), Anspach(7) and others have suggested the ratio be-

tween the fibroelastic and fibrous connective-tissue fibers as probably an important factor in controlling bleeding, but Smith(8) was unable to verify this in his specimens.

Pankow(9) says, "From a comparative anatomical examination of uteri from bleeding and nonbleeding multiparæ and nulliparæ, there is no evidence of anatomical change to account for hemorrhage. All the changes in the myometrium considered in causal relation with bleeding are found only in part of the clinical bleeding cases, and are found in others having no clinical history of bleeding."

Just as muscular insufficiency of the uterus, due to repeated pregnancies and involutions, in cases in the preclimacteric period and at the menopause, has been suggested as a cause of bleeding, so has chronic metritis, due to organic and inorganic poisons, and congestions, been suggested in earlier cases as causing a similar insufficiency of the uterus.

We can attempt to reconcile this like condition due to different causes by the biological law, that, whenever the parenchyma of an organ degenerates or atrophies through disease, lack of activity or overexertion, connective-tissue development ensues to replace it and establish a mechanical equilibrium, either fibroelastic or the more poorly organized fibrous connective tissue.

There seems to be an analogy between true diffuse arteriosclerosis in the life cycle of the individual, biological in variable degree after maturity, but distinctly pathological at an earlier age, and local hypertrophy and sclerosis of the uterine vessels in the functional cycle of the uterus, biological in variable degree in the preclimacteric period and at the menopause, but more distinctly pathological prior to that time.

The present tendency is to regard sclerosis of the uterine vessels, also many changes occurring in the ovary, endometrium(10) and myometrium, formerly considered as distinctly pathological conditions, as biological changes developing during the functional cycle of the female generative organs.

The hyperplasia(11) of the endometrium often found associated with sclerosis of the uterine vessels and hemorrhage is not to be considered a true endometritis, but should be looked upon as a result rather than a cause of bleeding. The endometrium does not undergo thorough involution after one hemorrhage before another occurs with its attendant hyperactivity. As this hyperplasia is found at times unassociated with uterine hemorrhage, and, in many cases of hemorrhage, it is entirely lacking, it cannot be considered the cause of bleeding in these cases.

Westphalen and Thoma state that the uterine vessels show degenerative changes earlier than any other system of vessels in the body, due probably to changes in blood pressure and periodical dilatation incident to menstruation and pregnancy, and, also, that the ovarian arteries show identical changes with those of the uterus in the same case. Consequently, analogous to biological changes in the uterus, we may look upon the changes in chronic oophoritis—thickened tunica albuginea, increased connective tissue in the stroma, small cystic degeneration and sclerosis of the vessels—as biological changes in the functional cycle of the ovary. No anatomical or pathological change has been found in the ovary characteristic in these cases of hemorrhage. Diseased ovaries continue their function of initiating congestion of the uterus, just as the diseased thyroid gland prevents the development of myxedema.

Certain conditions that would be suggestive in causing congestion of the endometrium—onanism; excessive venery; high living; endometritis; malpositions of the uterus; uterine tumors; heart, liver or kidney disease; psychic disturbance; unstable balance of the vasomotor mechanism; laceration of the cervix with erosion; tubal disease; ovarian tumors; pelvic abscess—are often found coexisting in these cases without causing any disturbance of menstruation.

Frankl's(12)theory of a ferment from the uterine glands altering the endometrium by biochemical change and permitting the escape of blood, and also, Sturmdorff's (13) theory of a secretion from the endometrium that which the clotting of the blood, do not account for the bleeding in these cases, as the type of menstruation and hemorrhage is not dependent upon the anatomical character of the endometrium.

Further study of the effect of the internal secretions as associated with uterine bleeding is indicated. Is any anatomical or pathological condition of the mammary glands, thyroid gland, pituitary or adrenal bodies, associated with uterine hemorrhage, characteristic?

Bandler(14) is of the opinion that poor muscle and elastic tissue fibres are present, degeneration being replaced largely by fibrous connective tissue, and that the vessels and capillaries have also lost their elasticity or become sclerotic, and, consequently, the uterine wall is unable to resist the congestive influence of the ovaries for the usual period of twenty-eight days, and bleeding comes on every two or three weeks, metrorrhagia, or there is inability to check the normal menses, menorrhagia, or both. In other words, when biological or pathological changes overbalance, causing muscular insufficiency of

the uterus and hypertrophy and sclerosis of the uterine vessels, possibly the equilibrium between the augmentative and inhibitory forces of congestion is destroyed, while the ovaries retain their normal function of causing uterine congestion, and bleeding results.

Solowij(15), Rabinovitz(16) and others claim that the changes in the vessels do not constitute a true arteriosclerosis. The morphological change in true arteriosclerosis extends from the intima outward (Gull and Sutton), while Solowij says, these cases show connective-tissue growth around the adventitia into which it finally extends. The intima is normal except occasionally a slight increase in the endothelium, while, in true arteriosclerosis, there is an increase in the number or size of the endothelial cells and a tendency to the obliteration of the blood-vessel lumina by growth of connective tissue from the intima, which may also extend outward toward the media causing atrophy of its muscle fibers, and, finally, into the adventitia. The media undergoes a muscular hypertrophy, probably compensatory, termed "hypermyotrophy" by Reinicke, and, at times, shows hyaline degeneration of the muscle fibers. The adventitia shows a very pronounced increase of connective tissue. The lumina of the vessels are either gaping, narrowed or closed by the meeting of the opposite surface of the circumference, and any narrowing or obliteration would be due to muscular hypertrophy of the media. These cases do not necessarily show arteriosclerotic changes in other parts of the body. The bleeding is not due to the friability or atheromatous condition of the vessels. Associated with the vascular change, there is an increase of connective tissue in the uterine wall between the muscle bundles, between the muscle fibers and around the blood-vessels, and a diminution of the muscular structure, which, in many cases, shows hyaline degeneration. The hypertrophied, sclerosed vessels, due to lessened compressibility, contractility and retractility, favor an overcongestion of the venous plexus of the endometrium. The apparent(17) increase in the size and number of the vessels is probably merely an hypertrophy and dilatation of those already present.

Thoma has called attention to the fact that the arteries lose their elasticity before they show sclerosis in true diffuse arteriosclerosis, and Guiteras(18) notes that the loss of elasticity occurs in the early stages and is compensated for by an hypertrophy of the muscular coat. May not the absence of the later manifestations of true diffuse arteriosclerosis, atheroma, calcareous infiltration and friability of the vessels, be due to the fact that this local condition exists when the causes producing the other are not yet operative?

The varicose veins present in certain of these hemorrhagic uteri may give intractable bleeding after curettage(19). They are dilated, hypertrophied and sclerogenic in character corresponding to the same process in the arteries, their media, of course, not being well developed as in the arteries, permits dilatation. The loss of contractility of the uterine wall permits congestion of the veins, as there are no valves(20) in the intrinsic uterine veins.

Bonney(21) concludes that the extent to which these uteri are diseased is not well established, as the fact that, after utriculoplasty, the conserved portion of the uterus may revert to the performance of normal menstruation, impregnation and delivery, proves that the uterine wall may be insufficient, but that it is not greatly abnormal, and shows the wonderful recuperative power of the uterus.

The loss of blood in these cases of intractable bleeding may cause sudden death, or anemia, chronic invalidism, loss of general vital resistance endangering life from intercurrent diseases, loss of local resistance predisposing to infections, or, possibly, tumor formations.

The diagnosis of hypertrophy and sclerosis of the uterine vessels depends upon microscopical examination of pieces excised from the cervix. Examination of the scrapings from the endometrium are chiefly of value in excluding malignancy of the corpus uteri. However, the condition of the vessels in the cervix is not conclusive as to the condition of the vessels in the corpus uteri, only suggestive.

Cases of true arteriosclerosis of the uterine vessels have been described by Cruveilhier, von Rokitansky, Klobb, Findley(22) and others, but these occurred in individuals long past the climacteric and were associated with general senile decline. Such hemorrhages took place into the uterine parenchyma, endometrium, or myometrium, apoplexi uteri, the blood rarely finding its way to the uterine cavity, or, in such small amounts, as to require no interference.

It is questionable, if, with our present limited knowledge of the pathology and etiology of uterine hemorrhages complicated with sclerosis of the uterine vessels, preventive treatment can be of any benefit. Excluding malignant disease, we are at a loss to satisfactorily explain these hemorrhages.

There seems to be an analogy between the development of cancerous tumors in the general epithelial tissues of the body, common after maturity, but rare at an earlier age, in the life cycle of the individual, and their development in the local epithelial tissues of the uterus in the preclimacteric period and at the menopause, but much less frequently during its earlier functional cycle. Proliferation of fibrous connective tissue is the feature in common. Evidently,

it was this condition of the tissues that Ribbert(23) had in mind when expounding his theory as to the causation and development of cancer, viz.:

(1) The epithelium has no excessive proliferative power in old age, but has its original or lessened proliferative power.

(2) The subepithelial connective tissue (around the glands, under the skin, under the mucous membranes) proliferates, grows upward in the direction of least resistance, surrounds and separates groups of epithelial cells from normal epithelial tissues.

(3) Such groups of epithelial cells are no longer subject to their normal tissue tension or pressure, which prevents them from overgrowing neighboring tissues, but grow *ad libitum* and burst through their abnormal confines producing metastasis and ulceration.

Believers in the parasitic theory of cancer might claim this condition of the tissues a favorable soil.

It is suggestive, at least, that, in a certain percentage of cases, we are possibly dealing with precancerous conditions. Careful investigations, however, in this direction have thus far failed to substantiate this theory, but these negative results cannot be accepted as deciding this question. We know how obscure, how misleading, the conditions are in the precancerous stage of other organs. The history of patients with cancer of the stomach, for instance, often shows that they have been under medical care for irregularities in indigestion, for chronic gastritis (chronic catarrh of the stomach), many years, have gone from one watering place to another, until more serious symptoms developed clearing the diagnosis. Uterine hemorrhages, irregularities in the menstrual flow, should, therefore, receive the most serious consideration of both the women and the physicians. Unfortunately, women are too ignorant with regard to their sexual organs, do not understand the importance of an early diagnosis, and listen to the gossip of friends rather than to the advice of the physicians. Attempts to instruct them through literature, as inaugurated many years ago by Winter in Germany, have been only partially successful. The way to reach the masses is through the schools, as advocated by F. Blume 24, as follows: "The education must begin in the final grade of our public schools, and should be continued in the high schools and colleges. The classes are to be divided so as to separate the sexes. A female teacher should instruct the girls, and a male teacher should educate the boys, among other topics, upon the dangers of gonorrhea, abnormal vaginal discharges, etc." The education of the laity upon sexual matters is one of the most important problems before the profession at the present time.

A very important step in the right direction has been taken recently by the Chicago schools by the introduction this Fall of instruction upon sexual matters to the pupils.

There is diversity of opinion as to the proper treatment of this condition. Some writers recommend hysterectomy as soon as the diagnosis of sclerosis of the uterine vessels has been made. Evidently, such a radical measure is permissible only under certain conditions. The sclerosis of the uterine vessels has nothing to do with the hemorrhage, it is only a complication of a condition outside of the uterus which is the cause of hemorrhage, but which, thus far, we have not been able to satisfactorily locate. If a degeneration of the uterine vessels is found in patients who come to us for other ailments than hemorrhage, as in cases of laceration of the perineum and cervix, ectropion and erosion of the cervix, cervicitis, etc., hysterectomy is contraindicated. Patients with uterine hemorrhages not due to malignant growth, but complicated with sclerosis of the uterine vessels, should not be subjected to hysterectomy unless the ordinary simpler methods of treatment have failed to give relief. This rule is especially applicable to women during the child-bearing age.

REFERENCES.

1. Jones. AMER. JOUR. OBST., Feb., 1913, vol. lxvii.
2. Krusen. AMER. JOUR. OBST., May, 1913, vol. lxvii, p. 885.
3. Gardner and Goodall. *Brit. Med. Jr.*, 1906, ii, 1176-1188. Chronic Metritis and Arteriosclerotic Uterus.
4. Reinicke, E. A. *Arch. f. Gyn.*, 1897, B. liii.
5. Theilhaber, A. *Arch. f. Gyn.*, 1900, B. lxii, 415; *Arch. f. Gyn.*, 1902, lxvi, Heft i. *Monatschr. f. Geb. u. Gyn.*, 1903, S. 972. *Münch. Med. Woch.*, 1905, B. lvii, 1249.
6. Goodall. AMER. JOUR. OBST., lx, No. 6, p. 921.
7. Anspach, B. M. *Univ. Pa. Med. Bulletin*, xviii, No. 12, p. 322.
8. Smith, R. R. *Surg., Gyn. and Obst.*, 1901, x, 17-27. The Subinvolved Uterus.
9. Pankow. *Zeitschr. f. Geb. u. Gyn.*, lxv, 336.
10. Hitschmann u. Adler. *Zeitschr. f. Geb. u. Gyn.*, 1907, B. lx.
11. Norris and Keene. *Surg., Gyn. and Obst.*, 1910, x, 44-54. Changes in the Normal Endometrium during Menstrual Life.
12. Outerbridge, G. W. AMER. JOUR. OBST., May, vol. lxvii, No. 5, p. 971.
13. Frankl. *Arch. f. Gyn.*, 1911, xcv, 269-313.
14. Sturmdorff. *N. Y. S. J. Med.*, 1911, ii, 1161-1164.
15. Bandler, S. W. *Am. Jr. Surg.*, March, 1909. *N. Y. M. Jr.*, vol. xli, No. 24, 1209-1211.
16. Solowij, A. *Monatschr. f. Geb. u. Gyn.*, B. xxv, S. 291.
17. Rabinovitz. AMER. JOUR. OBST., 1910, lxi, 51-63. Fibrosis of the Uterus as a Cause of Preclimacteric Hemorrhage.

17. Chalfant, S. A. *Jr. Am. Med. Assn.*, lvi, No. 4, 239. Arteriosclerosis of the Uterine Vessels.
18. Notes on lectures of Prof. John Guiteras, 1895, p. 141. Avil Printing Co., Phila.
19. Simpson. *AMER. JOUR. OBST.*, lii, No. 5.
20. Sampson, J. A. *Surg., Gyn. and Obst.*, 1912, xvi, No. 2, 144. The Influence of Myomata on the Blood Supply of the Uterus, with Special Reference to Abnormal Uterine Bleeding.
21. Bonney, V. *Lancet*, Lond., May, 1911, vol. i, No. xix, 1266-68. Six Cases of Utriculoplasty for Uterine Hemorrhage.
22. Findley, P. *AMER. JOUR. OBST.*, 1901, vol. 1, p. 30.
23. Ribbert. *Deutsch. Med. Wochenschr.*, 1895, vol. xxi, S., Nos. 9-24-45-62. Cullen's Cancer of the Uterus, 1900, pp. 653-654.
24. F. Blume. *Penna. Med. Jr.*, Feb., 1905, vol. viii, No. 5, 299-304. The Early Diagnostic Signs of Cancer of the uterus.

TRANSACTIONS OF THE NEW YORK OBSTETRICAL SOCIETY.

Meeting of November 18, 1913.

The President, DR. HOWARD C. TAYLOR, in the Chair.

DR. HERMAN BOLDT reported the following cases:

I. REPARATIVE OPERATION ON THE BLADDER.

This injury was caused by a forceps delivery done October 22, 1912, as the result of which, the base of the bladder was torn open so that four fingers could be readily introduced into the same. In addition, the entire urethra was torn away and only the urethral orifice was left attached to the left side of the vulva. The reparative operation was as follows. The mucus membrane was separated about $\frac{3}{4}$ inch around the entire fistulous opening after which the bladder was closed with a continuous No. 1 chromic gut suture, including two stitches in the sphincter at the vesical neck. The broad surface of vaginal mucosa remaining was then brought together with a mattress suture of chromic gut. No attempt was made to form a separate urethral canal but the suturing was continued along the anterior vaginal wall to the point where the orifice should have been. A medium-size male soft-rubber catheter was inserted and sewn in so that it could not slip out. This was removed on the fourth day. The result was perfect and while the capacity of the bladder is not normal, still the patient can hold her urine for from one and one-half hours to two hours and has perfect control of the same.

2. CARCINOMA OF THE OVARY.

This patient was operated on July 16, 1907 and the diagnosis was confirmed in the pathologist's report. The patient was seen two

days previous to the date of the present report and as she was apparently free from recurrences, it is reasonable to suppose that she is cured permanently.

3. PREGNANCY AFTER THE MENOPAUSE.

This woman was forty-five years of age, had had climateric symptoms extending over a period of three years and for more than a year had ceased to menstruate entirely. On November 5, 1913, she was suddenly seized with a severe uterine hemorrhage and during the following eight days, had three additional hemorrhages. When first seen by me she was very anemic with a poor condition of the pulse and the bedding was saturated with blood. Her physician assured me that she was entirely pulseless when he came to her a few hours earlier. After removing the vaginal packing which had been introduced, the uterus was found to be slightly enlarged and a trifle softer than normal. It was retroverted. The profuse character of the flow and its sudden onset together with the local findings, led to the diagnosis of incomplete abortion. The patient's positive statement that impregnation was not to be thought of, and because the menopause had apparently come on, led to the thought that a uterine polypus was present. A curettage was done and the instrument brought forth tissues which had every appearance of placenta. The laboratory report confirmed this opinion. On closer questioning the patient informed me that she did not think that it was possible for her to become pregnant because as she believed, her husband was impotent and had not been able to enter her vagina for several years. The interesting feature of the case was that impregnation took place after the menopause had been established for at least one year.

DISCUSSION.

DR. H. N. VINEBERG.—I can recall a similar case of carcinoma of the ovary which I had about fourteen or sixteen years ago in which there was no recurrence nine years later. The tumor was an enormous size and the entire abdomen was filled with the growth and ascitic fluid. The woman was not married at the time but married afterward and had a child. When last seen, about eight years later she was still free from recurrences.

DR. GEORGE L. BRODHEAD reported a case of

CESAREAN SECTION FOR DOUBLE MULTILOCULAR OVARIAN CYST.

The patient gave the following history. She was twenty-five years of age, married five years and had had no miscarriages. One confinement about three years previously in which the membranes ruptured twenty-four hours before onset of labor. The pains continued for several days and finally a dead child weighing 9 pounds was extracted by forceps. The patient came to me in March,

1913, when two months pregnant. She was exceedingly anxious to have a living child. The pelvic measurements were normal except that the inlet seemed rather narrow. The pregnancy was uneventful until the end of the eighth month when on examination an interesting condition was found. The position of the fetus was L. O. A. with the head above the brim and in Douglas' pouch was felt a tumor resembling a dermoid or other ovarian cyst. The patient was advised to assume the knee-chest position twice daily in the hope that the growth would become elevated. At eight and one-half months the patient was again examined under ether and I attempted to replace the tumor with the patient in the knee-chest position. This was impossible and then the patient consented to have a Cesarean section at term. On October 22, 1913, the operation was performed and a child weighing 8 $\frac{1}{4}$ pounds was extracted in good condition. The right ovary was found to be the seat of a multilocular cyst the size of two lemons and was crowded down in the culdesac. It was readily removed. The left ovary was in the same condition and of about the same size. It was likewise removed and the abdomen closed. The patient made an uninterrupted recovery, leaving the hospital with her child at the end of three weeks. The interesting feature of these cases, is the plan of treatment to be advised should the tumor be found at a time other than at the last month of pregnancy. If a diagnosis is made at the fifth or sixth month for example, should a removal by vaginal section be resorted to, or should an effort be made to replace by posture, and failing in this, should a Cesarean section be done at term with a removal of the growth at the same time? In my case, the course pursued was the best but the question of what should be done in other months is an interesting one for discussion.

DISCUSSION.

DR. J. O. POLAK.—I would like to ask Dr. Brodhead why he left the uterus after taking out both ovaries and doing the Cesarean section.

DR. H. N. VINEBERG.—A case that I saw with Dr. Brodhead at another time shows how conservative we ought to be in these instances of supposed tumors of the ovaries during pregnancy. In this instance, a young woman pregnant about five or six months, presented a cystic mass in the culdesac of about the size of a lemon. The woman had no other symptoms except a little pain. I believed that as the tumor was readily accessible it could be easily removed by a posterior vaginal section. Dr. Brodhead at the time expressed the opinion that the woman could be allowed to go to full term and a Cesarean section performed when labor set in, together with the removal of the tumor. The woman through some misunderstanding did not take the advice of either, went to full term was delivered, and the tumor subsequently disappeared; so this was a case in which intervention would have been unnecessary. I must confess

frankly that I was somewhat surprised at the opinion expressed at that time because my experience with at least a half dozen cases of this kind, favored the removal of the growth by posterior vaginal section, as very little disturbance resulted and the woman went on to full term.

DR. AUSTIN FLINT, JR.—I had a case only last week which shows the difficulty of prognosticating exactly what is going to happen in these cases. This patient had a large fibroid, was pregnant about six months and had a great deal of abdominal pain. I expressed the opinion that she ought to be allowed to go on to term and then have a Cesarean section done as I did not think it possible that the woman could give birth to a child by the natural channels as the pelvis was entirely filled up with this mass. I found, however, that the woman subsequently went into labor and gave birth to a 6 1/2 pound child without any especial difficulty. The experiences we have had should therefore lead us to favor a conservative rather than a radical attitude.

I would like to refer to Dr. Polak's question, as to why the uterus was left after taking out both ovaries, as I think this is a question which ought to be discussed.

DR. F. A. DORMAN.—I believe that in cases of this kind, a patient ought to be observed carefully until she goes into labor and then an attempt made to replace the growth. If this fails, a Cesarean operation is indicated. This has the disadvantage of making the operation more serious than if it had been performed at a selected time, at the same time, there is a chance in these cases of ovarian tumor in the pelvis, that replacement may be successful, especially after the patient has gone into labor. I followed a case similar to the one reported, with a great deal of anxiety several years ago. There were two cystic ovaries, one of which was replaced in the seventh month, the other was adherent and could not be moved. The question of immediate operative interference suggested to the patient was considered but at the time of labor it was possible to displace the obstructive mass and the head engaged.

DR. R. F. FRANK.—I think we should distinguish rather closely between fibroids of the uterus and ovarian tumors because we will eventually have to operate in every case of ovarian growth of any size but in the case of fibroids after pregnancy is over, we usually find that the tumor recedes. Moreover, they rarely appear to cause as great an obstruction as the ovarian growths and may often be pulled up out of the way. I think that ovarian tumors should be removed early in pregnancy. The safest time is between the third and fourth months, because in one or two cases where this was done during the second month, abortion resulted; otherwise a removal may be done at almost any time during pregnancy without any interruption of the same.

During the past summer I treated two cases of ovarian cyst in pregnancy. In one it was necessary to operate during the second month but the pregnancy went along undisturbed. In the other case a pregnancy of the fifth month was present and in this woman

one ovary had already been removed. There were symptoms of torsion of the pedicle present and it was necessary to remove the second ovary notwithstanding. The pregnancy went along undisturbed. In a third case still under observation, in which a pelvic tumor was present, operation at the fourth month was declined for various reasons. At the sixth month, as in this case brought up by Dr. Brodhead, operation is to be carefully considered, as at this time the uterus is large and the tumor hard to get at, so that considerable force might have to be resorted to, to deliver the same, with a possible interruption of pregnancy. Although these tumors are readily accessible through the vagina, I believe the vagina should be left alone during the course of labor and I do not approve of posterior section which is liable under such conditions to leave an open wound with a possibility of subsequent infection. The abdominal operation is therefore the proper one to do. If the mother is a multipara and has a large pelvis and consequently ought to have a second child without much trouble, it seems to me that under the circumstances, the cyst may be evacuated through a median incision in the abdomen. If the latter is small it will stand the strain of labor without any difficulty.

DR. J. O. POLAK.—My experience with these conditions has been very much like that of the previous speakers. We have done the Cesarean operation in five cases where growths of the ovary obstructed labor. We have had three other instances in which ovarian tumors of almost equal size were lifted out of the pelvis and labor produced, so that I believe that unless these growths are recognized at the third or fourth month, it is far better for the patient to go to term and to decide on the procedure to be followed when labor has begun, rather than attempt to do an operation such as that suggested by the last speaker. I should certainly prefer to do a Cesarean section and remove the tumor rather than to puncture the same and trust to the previously incised abdominal wall going through the processes of labor immediately afterward. I do not think that this would be a surgically safe procedure as compared with a Cesarean section combined with a removal of the growth. In the case of uterine fibroids I have had a number of experiences which have been very unfavorable. On four occasions I have seen fibroids incarcerated as I supposed, in the pelvis. Two of these patients were sent to the hospital and in their transit the fibroids got out of the pelvis and delivery was subsequently accomplished. In the other two cases a similar retraction occurred. Only one case in all that I have seen incarcerated has demanded operation at the time for delivery of the child, showing that uterine fibroids will do more, as a rule, than ovarian tumors during the process of labor.

DR. JOSEPH BRETTAUER.—The point brought forward with reference to the difference between fibroids and ovarian growths in pregnancy is, I think the most important one referred to in this discussion. Fibroids will do what ovarian tumors will not do. Fibroids are in my opinion, not progressive growths, whereas ovarian tumors are. Ovarian tumors have to be removed and I agree with Dr.

Flint as to the value of the operative removal when the diagnosis has been established. When a diagnosis of ovarian cyst is made, pregnancy or no pregnancy, the tumor ought to be removed. The route of its removal depends on the likes and dislikes of the particular operator. Notwithstanding possible dangers, as referred to by Dr. Flint, I would infinitely prefer to remove through the vagina, an ovarian cyst which is low down in the pelvis and is crowded down by a three or four months' pregnant uterus. At the end of pregnancy, however, conditions are entirely different. One fact must be borne in mind in the diagnosis of these tumors, namely, that in the place of a cyst, a soft fibroid may be present, and the mistake is only found out at the time of operation.

DR. HUSSEY.—Although my experience with ovarian cysts of this kind is limited to only three cases, it does not entirely coincide with that of the previous speaker. In the first case a cyst about the size of a lemon was removed between the third and fourth months of pregnancy and although we were as careful as possible, the woman promptly aborted on the following day. My second case was a woman in labor at term. She presented an ovarian tumor about the size of an orange which was believed would interfere with the delivery of the head. We were prepared to operate but before the preparations were complete, the tumor slipped out of the way and the patient delivered herself. The third case presented a large multiple ovarian tumor in which no advance occurred although the woman had been in labor several hours. A Cesarean section was done and the tumor also removed. It seems to me that the course of treatment in ovarian cyst during pregnancy depends on the variety present. I certainly agree with the speaker who said that in a multipara where an easy labor is to be expected and a cyst can easily be removed that it is better to do so for the reason that every case of Cesarean section is necessarily a greater risk than an ordinary labor at term. Moreover, a woman who has had a previous Cesarean section will in the future be subjected to additional risk during a subsequent labor.

DR. BRODHEAD (closing the discussion).—I believed that the presentation of this specimen would provoke considerable discussion and I am certainly gratified with the result. In one of the obstetrical text-books I found a description of a case of labor at term with a fibroid obstructing delivery, in which it was advised that the course of procedure was to open the abdomen, deliver the uterus, remove the tumor, replace the uterus, sew up the abdominal wall and allow the patient to go on with her labor. It seemed to me that this would be a wrong plan of procedure. Another method suggested included opening the abdomen, removing the tumor and then deliver the child by means of forceps. It seems to me that no one should undertake an operation of this kind because the result would certainly not be as good as by laparotomy and Cesarean section. Dr. Vineberg in his remarks I think misquoted me. I did not advise the patient going to term and then having a Cesarean section without first advising that an attempt be made to replace the tumor during

the seventh or eighth month and if the tumor could not be replaced later on, that Cesarean section be performed and the tumor removed at the same time. Dr. Dorman referred to the possibility of replacing the tumor at term when it might not be possible at the eighth month or earlier. I waited until eight and one-half months because it seemed to me that the tumor could not be replaced at that time nor at the ninth month. For if I could have gotten the tumor back at eight and one-half months I would have induced labor and probably had a good result.

DR. FRANCIS FOERSTER presented a specimen of

FIBROSARCOMA OF THE OVARY.

Fibroma and more so fibrosarcoma of the ovary are of rather rare occurrence. In my experience I have met the latter condition not more than eight or nine times, while I saw probably only four or five fibromata of the ovary. This observation of rarity of this class of cases coincides with the statements of European clinics on this point. The Vienna clinics with their ample material, have met with only six cases of fibrosarcoma of the ovary in five years. Fibroma ovarii plain and simple may occur more often than we assume, for it is well known that fibroma of the ovary usually does not produce any symptoms, it becomes only a disturbing factor when by excessive size it exerts pressure upon neighboring organs or in its congested state due to twisted pedicle or its entering malignant changes, it causes local irritation of the peritoneal cavity. Most of my fibroma cases were discovered accidentally. The majority of my fibrosarcoma cases, on the other hand, were in an advanced stage of degeneration. As to the age of the patients, I found both varieties in the first three decades of life, my youngest patient being five, my oldest thirty-three years old. Apparently the condition exists on one side only. I had only one case where both sides presented a fibroid growth, yet I had good reason to believe that the fibrous change occurs on both sides very frequently although to a varying degree. I base my assertion on the microscopical examination of two ovaries which I removed in my earlier practice, ovaries which showed microscopically no marked changes, while their companions were tumors of the size of a fist. In the case before you I left the other ovary *in situ* for future reference although the history indicated plainly that the ovary was unable to perform its function, and its shrivelled appearance was by no means promising. Among the twelve cases mentioned, in three cases I found as a prominent symptom, amenorrhea of several years standing. It is for this reason that I brought this specimen to elicit whether you have had similar experience and whether amenorrhea in young women not afflicted with obesity or constitutional disease, should not be looked upon as a pathognomonic symptom of fibroma ovarii on both sides. The microscopical examination of the two ovaries showed a total suppression of the follicular region of the stroma by fibrous tissue. Of the three cases, one showed sarcomatous degen-

eration, the other has undergone calcareous changes, was transformed into a stone, the third was a plain fibroma. The history of the case presented is similar to the histories of the other two cases in which amenorrhea was present.

Patient L. B., unmarried, twenty-three years old, menstruated when sixteen years old, menstruation diminishing up to twenty years, when it ceased. No discomfort. Patient's mother died when twenty-nine years old of a rapidly growing tumor in her abdomen. After an exertion patient noticed a mass in her left side which became rapidly larger and painful. She entered the German Hospital. Diagnosis, fibromi ovarii. Operation showed congested tumor of the ovary, twisted pedicle. The other ovary was normal in size of a shrivelled appearance, no follicles cystic or otherwise were discernable. The laboratory report states: early stage of sarcomatous change of fibroma ovarii.

The pathological report from the Laboratory of the German Hospital is as follows.

Anatomical Diagnosis.—*Fibrosarcoma of ovary.*

Gross Appearance.—Specimen consists of a Fallopian tube and ovary. The latter appears replaced by a large tumor mass. The Fallopian tube appears normal as do the adjacent portions of the broad ligament. The tumor occupying the situation of the ovary is ovoid in form measuring 12 by 10 by 6.5 cm. The outer surface for the most part is covered, by a smooth glistening peritoneum here and there roughened by adhesions. The consistence is fairly firm. On section the cut surface appears of a fine velvety yellowish color marked here and there by small rounded white nodules. The central portion of this mass is made up of loose somewhat spongy connective tissue replacing the yellowish parenchyma elsewhere found.

Microscopical Examination.—Of sections taken from various portions of the tumor shows it to be made up almost entirely of rather short spindled cells resembling those of the normal ovarian stroma between which is found rather abundant fibrillar intercellular substance. Scattered throughout these spindled cells are found numerous broad trabeculae of well-formed adult fibrous tissue bearing the blood-vessels and serving as the framework. The various macroscopic pictures appear to depend upon the relative proportion of the adult fibrous tissue and spindled cells; in the central portion, the former being more abundant than in the peripheral region. On the outer surface appears a dense uniform fibrous tissue capsule which is nowhere infiltrated or invaded by the spindled cells, denoting the low grade of malignancy of the tumor. No epithelial structures are found. There are no mitotic figures. The tumor can probably be classed as a fibrosarcoma of a very low grade of malignancy.

DISCUSSION.

DR. GEO. GRAY WARD, JR.—I merely desire to refer to a case which I operated on quite recently in which there was a history of

dysmenorrhea in a woman about thirty years of age whose menstruation was established at the regular time. There were only three distinctive menstrual periods since the beginning of this process and none since. The woman suffered with inflammatory pelvic troubles and on opening her abdomen, both appendages were buried in a mass of adhesions which likewise involved the uterus. I desire to call attention to the fact that there was a complete amenorrhea in this patient after only three periods, although she seemed to be a perfectly developed woman. The uterus had been buried in adhesions which undoubtedly resulted in its atrophy but the amenorrhea in this particular case was presumably due to the involvement of the ovaries and the adhesive process which resulted in their destruction so that no distinguishing features remained.

DR. JOSEPH BRETTAUER presented a specimen of

FIBROCYST OF THE UTERUS.

The tumor was removed on November 14, 1913, weighed 26 pounds, and contained 9 quarts of dark brown fluid. The special points of interest in this case were the infrequent occurrence of such large tumors at the present time, the entire absence of any discomfort except the increase in the size of the abdomen, and the certainty with which the diagnosis of a fibroid cyst could be established before the operation, as the patient had been seen by him eight years previously when she presented multiple fibroids extending beyond the umbilicus and refused operation. A diagnosis of ovarian cyst was made in several gynecological clinics.

DR. BRETTAUER also reported a case of

VAGINAL HYSTERECTOMY AFTER INTERPOSITION.

This specimen, a uterus was removed from a patient, forty-four years of age, on November 10, 1913, by supracervical amputation. Dr. Brettauer had done an interposition operation two years previously for the relief of a large cystocele, which recurred after a plastic operation that had been done five years ago. A prolapse of the entire interposed uterus resulted a few months after the last operation, with marked bladder symptoms. Inability to empty this viscus was the most prominent complaint. The operation was difficult owing to the firm attachment of the posterior bladder wall to the posterior wall of the uterus. It was done entirely extraperitoneally, leaving a thin shell of the uterine muscular coat attached to the bladder. This was sewed to the cervix and the entire surface closed with running sutures in two layers.

DISCUSSION.

DR. J. O. POLAK.—The last case is the most instructive one that has been brought before the Society in a long time. In this interposition operation I think all of us have made mistakes. We have

learned from experience that if a large uterus is displaced underneath the bladder it will give rise to the same result. I have two cases in which I am desirous of doing a supracervical amputation for the cure of prolapsus of the uterus through the interposed tissues. It would be preferable to confine our interposition operation to those cases with small uteri, found in women past the menopause and presenting a marked cystocele. In such cases we ought to get 95 per cent. of cures if the operation is done promptly, but in the patients presenting a large uterus, this must be sacrificed by a supracervical amputation, or diminished in size, otherwise a recurrence of the trouble will occur as shown by Dr. Brettauer's case.

DR. ASA B. DAVIS.—I desire to say a few words regarding the interposition operation as I see the results of it in women who are still in the child-bearing period. A few months ago I had a case in the Lying-in Hospital in which this operation had been done. The woman had become pregnant and progressed to the seventh month. She had been in labor a good many hours before admission and showed the physical effects of the same. There was no dilatation of the cervix, however, and it was so rigid that the finger could not be introduced. The patient was having violent pains in quick succession and the only relief seemed to be by means of a Cesarean section, which we did. The child unfortunately lived but a few hours. On examination, a carcinoma was found in the lower segment of the uterus in which no dilatation whatever had occurred. There was no history of any previous bleeding. I have now operated on nine cases in which different forms of a suspension or fixation of the uterus were done, all of which required Cesarean section. I think we must therefore take into consideration the dangers of such operations in child-bearing women.

DR. HIRAM VINEBERG.—In reference to this subject and especially in answer to Dr. Davis' experience I want to say that for some time past, those of us who favored the operation of vaginal interposition, as it is frequently called, have not done it on women in the child-bearing period unless the patient has had children, and both husband and wife consent to amputation of the tube. I would therefore consider the operation contraindicated where there was any prospect of pregnancy. I would like to ask the speaker whether he fixed the uterus into the vagina originally. A great many men bring the uterus too far forward. It has been my custom ever since I started doing this operation, after I deliver the uterus and examine the cervix, to push it back into the pelvic cavity and to put my first sutures through the anterior part of the fundus. In practically all of these cases it is also my custom to do a fairly high amputation of the cervix, and while I have met with a few instances in which the large uterus afterward practically became a fibroid growth and required removal, there was no instance in which the uterus prolapsed into the vagina as in Dr. Brettauer's case and thus interfere with the emptying of the bladder.

DR. F. A. OASTLER.—About a year and a half ago I had the opportunity to see three cases that had been operated by interposi-

tion operation from two to three and a half years previously. Each one of these cases complained of the same symptoms. The cystocele had been cured in each case, yet each woman complained of considerable pain, to such an extent in fact, that all of them were very miserable indeed. It seemed there was nothing we could do. The experience of seeing these three cases, and they all happened close together in a clinic, all complaining of the same thing, made me question the advisability of doing this operation.

DR. BRETTAUER (closing).—I have very little to say except I would like to answer Dr. Vineberg, and say that I never fixed the uterus in that way. The interposition operation means bringing the uterus forward under the bladder and not to the vagina, and it is a big difference. I don't pull the sutures tight without pushing in the uterus to see where it is going to be located, but between vaginal fixation and this interposition operation there is a big difference. I published a series of six cases of interposition operations in old women about ten years ago. The seventh case I did not do that way. In this case I was allowed to do it, because the cystocele was so large and the opening in the pelvic fascia so wide and no tissue left. The vaginal tissue was so thin there was nothing left to make a strong support for the bladder, and I thought a uterus whose cervix was small, would just fit in, and I did it. Of course, an absolute condition for this operation is for the patient to be beyond the climacteric. Anything else I would say is neglect and could not be called by any other name. To do that operation on any woman and let her have a chance to become pregnant and bear a child I think is not a surgical procedure.

DR. RALPH H. POMEROY read the paper of the evening, entitled,

THE TREATMENT OF OCCIPITO-POSTERIOR POSITIONS.

DISCUSSION.

DR. G. W. JARMAN.—This is a subject in which I have been a great believer for a great many years, but there is one manipulation the doctor did not mention. That is, when I rotate the child, I take my left hand, so that it comes down after it retracts. It is not a difficult thing to do, if as Dr. Pomeroy said, you first get good dilatation. I am going to give you a personal experience of this kind. It was seventeen years ago, and I remember distinctly the time from some other conditions that occurred. I had an English woman, one of the biggest, and finest looking women I ever saw. She had been confined in London nine times and came to this country and her tenth baby was delivered by me. She got very much annoyed because she always had very easy labor and this was very prolonged. An occiput-posterior position was present which would not rotate. Finally she was getting so restless and I was getting tired waiting, that I put the woman under an anesthetic, rotated the child and before I got my hand out the child came with it. The woman was not even completely under an anesthetic. When you placed your hand on the child's chin and raised the chest you forced

* To appear later.

out the head for with each contraction of the uterus, the child's head went backward. On very many occasions I have been persuaded to hold my hand there until the woman has had a good labor pain and forced the child down into the pelvis. If I thought that it was going to remain where it did, I would rotate it with my hand on the body.

DR. F. A. DORMAN.—It seems to me that these cases are practically limited to a pretty small class, namely, the primiparæ, where the fetal head is not disproportionate, has engaged and dilatation is present. It is only a small percentage of those cases that are going to remain obstinate posterior positions. With good driving pains the head will rotate or with the forceps the correction can easily be made. These are not hard cases. It is the big child presenting posteriorly, with a tremendous molded head, which is rotated with exceeding difficulty and is the one that produces the deep vaginal laceration. So it seems to me that while perhaps the method suggested is an easy way out of the difficulty, it is in a good many instances not necessary. The condition is one that we can handle pretty well with the head low down by our old methods. I am frank to say I have not had the experience of pushing the child up in the uterus again. It may help us in some cases but it seems to me that the field of its application is rather limited.

DR. JOHN O. POLAK.—I desire to say regarding the manipulation suggested by Dr. Pomeroy, that I agree entirely with Dr. Jarman, that it seems almost miraculous how the difficulty is solved by anterior rotation in the properly selected cases. I always try to remember this one thing, that the longer a woman is in labor the greater the change and the greater the molding of the head, and the less the chance of the life of the child. The very long delay of the second stage in occipito-posterior cases has resulted many times in the delivery of dead babies. Dr. Pomeroy has called my attention to the fact that the real factor is the fact that the upper segments of the uterus relax, and secondly the placenta is retracted, consequently we have more or less separation of the placenta in those cases. With this manipulation in selected cases, which can be very readily done under anesthesia, we have been able in the last few years to entirely do away with any damage from rotation with forceps which is, I think, the most dangerous procedure so far as the results of the pelvic floor are concerned, that we know of.

DR. AUSTIN FLINT, JR.—I am somewhat embarrassed in giving an expression or opinion on this subject, which is of such an interesting nature. I have repeatedly in my obstetric practice pushed up and rotated the head above the brim, and as I thought I gained more skill, I have often been able to diagnose a great many cases of occipito-posterior positions, which came through without the slightest trouble, rotating them myself, easily and quickly. The normal mechanism of rotation is that it helps labor. The head can be rotated by the hand in the majority of cases in the cavity of the pelvis provided there is no delay. I have sometimes pulled down a head occipitally, and have then rotated. I have very seldom tried

to rotate the head with forceps. That is a dangerous and difficult thing to do, and I think always results in damage. I would not hesitate now to take a woman at any time in prolonged labor where the head is high up and rotate it. That is the reason for long labor and its correction is good obstetric practice, namely, to remove the cause of the delay, but it is, I think in many instances a very dangerous thing to do. It is unnecessary it seems to me to push the head or to rotate the head above the brim on account of the possible obstruction.

DR. H. C. BAILEY.—The trend of the discussion of the occipitoposterior it seems to me would be to widen the field over and above what Dr. Pomeroy has stated, and knowing as we do, that the majority of those cases do rotate when the head reaches the pelvic floor, I think it would seem, at least to me, very inadvisable to limit this rotation to the primiparæ. The maximum of labor, is much more in the primipara because of the intact levators, and I would like to ask Dr. Pomeroy why he limits it to the primiparæ and also how he decides in the primiparæ which cases to rotate before the head molds, because the head as a rule has to mold before it strikes the levator.

DR. CARY.—I took the opportunity tonight to look up our hospital statistics on occipitoposterior positions for the last year. It has been a pleasure for me to be associated with Dr. Pomeroy, and I had the advantage of being taught this procedure by him.

We had a series of 264 cases and among these there were twenty posterior occiput cases that were treated. Seventeen of them were primiparæ and three were multiparæ. They were all instances in so far as I could see, of cases where the descent had either stopped or had been prolonged and the mother became exhausted with the head in the pelvis. Of this number, twelve cases were delivered spontaneously, the shortest one occupying fifty-five minutes after rotation was done and the other three were some eight hours with forceps. Most of them were too low for the forceps. There were no mothers lost, or no cases of prolapsus, but there are two cases in which the child was born dead. There were two cases in which there was a failure in the attempt to do rotation. In one case the head was abnormally molded and in the other the uterus had been previously suspended.

TRANSACTIONS OF THE NEW YORK ACADEMY OF MEDICINE.

SECTION ON OBSTETRICS AND GYNECOLOGY.

Meeting of November 28, 1913.

The President of the Academy, DR. WILLIAM M. POLK, in the Chair.

By special invitation, Geheimrath PROF. DR. KRONIG, Professor of Gynecology, University of Freiburg, Germany, addressed the Society on

THE RONTGEN RAYS, RADIUM AND MESOTHORIUM IN THE TREATMENT OF UTERINE FIBROIDS AND MALIGNANT TUMORS *

Following the address a demonstration of the methods employed in the above investigation was given by PROF. DR. C. J. GAUSS, also the University of Freiburg. He stated that Röntgen ray treatment was for a long time confined to the body surface, as attempts to use the harder rays had resulted in surface burns from the less penetrating rays. It was known now that the rays had different degrees of penetrability and that by using metal filters the passage of the softer rays could be prevented. In experimenting on tadpoles with filtered and unfiltered rays Krönig and Gauss had determined that the filtered rays checked the growth and killed the tadpoles. They found that they obtained a deeper action with the filtered than with the unfiltered rays provided they could get enough of them. Results were dependent on the concentration of the dose in a short time. If the same dose that was concentrated into a short period, was given over a long period, it might even cause the growth to increase in size. The usual dose was 5, 7, or 10 milliamperes. By giving large doses in a short time, almost all patients to whom the treatment was applicable were cured. The average case of fibromyoma required from three to four months treatment, with an average total dosage of 1000 to 2000 milliamperes. In some instances they had been able to influence hopeless cases to such an extent that tumor cells no longer existed where before they had been growing most profusely. With the Röntgen rays alone they did not get results at any depth, but with the radium and mesothorium they were able to reach the deeper tissues. The gamma rays of radium and mesothorium could be applied to sections of the diseased area successively. The dose in each capsule was about 200 milligrams and this was enclosed in a metal filter. Where space was a consideration, gold had been used in place of lead, as in the uterus. In such confined spaces, the secondary rays were kept off by gauze or rubber. Treatments were

* For original article see page 204.

repeated about every three weeks until there was no trace of cancer. Then prophylactic applications were given later at intervals of three months. In general surface work the Röntgen rays were substituted for mesothorium as they had the advantage of covering a larger surface and were cheaper. Mesothorium was employed for the malignant growths. Where the results were delayed they added the vaginal mesothorium treatment which seemed to hasten the cure considerably. In applying the Röntgen rays the abdomen was divided into twenty or thirty sections of about 4 centimeters square, and the other parts were protected. Each section was now exposed in turn to the Röntgen-ray tube which was enclosed in its metal casing. The tube was lowered until the anticathode was from 12 to 20 centimeters from the surface of the area to be exposed. The tube was excited with from 5 to 10 milliamperes. The tube should always be of the same degree of hardness, and for the penetrating rays only, a very hard tube was used. The dose was from 5 to 10 milliamperes interrupted from fifty to seventy times per minute. The treatments were given at intervals of eighteen days and after from four to eight sittings, the desired amenorrhea was produced. The cure was usually effected in from three to four months, but it should be borne in mind that the treatments should not be too few. Krönig had also used radium and mesothorium platinum capsules. Professor Gauss exhibited capsules for introduction into the vagina and for external application, others for rectal application, and for application in the larynx and the esophagus. He said that the application of these capsules seemed very simple, but such was not the case, and no one should attempt such treatment without much instruction and experience.

DISCUSSION.

DR. GEORGE P. PFAHLER of Philadelphia said he was sure all felt as he did in that we owed a debt of gratitude to these men for having shown such excellent results and the methods by which they were produced. There were a few points that stood out prominently which Dr. Pfahler wished to emphasize. Dr. Krönig and Dr. Gauss had had a wide experience and had treated ten times as many patients as he had but his experience had extended over a longer period of time. Acknowledgment must be made to Dr. Gauss for what he had said in regard to the cross-firing method, which all had used, but they had not employed in the high dosage that he had recommended. Dr. Pfahler stated that he had been accustomed to divide the area to be treated into four instead of twenty or thirty parts and hence he had given only one-fifth or one-tenth of the dose, but his results had been more than one-fifth or one-tenth as good. He believed that they should take advantage of as much power as possible. The skin could be guarded against excessive doses. They, too, had developed a filter method. Seven years ago he had demonstrated to the Röntgen Society that the backs of rabbits could be protected by leather, and since that time they had been using filters.

When asked to take part in the discussion, Dr. Pfahler said he had

understood that the subject was to be malignancy, so he had prepared to give a lantern slide demonstration of the treatment of some forms of malignant disease showing the results extending over ten years or more. He showed slides illustrating the deep effect produced on a round-celled sarcoma involving the upper portion of the fibula. This patient had remained well for seven years. Another set of slides showed an osteosarcoma with fracture on the side of the ilium. The sarcoma had been chiseled off and Röntgen therapy applied. The osteosarcoma was of the giant-celled variety and after three years the patient was without any signs of recurrence. Another case of orbital sarcoma treated ten years ago with the defective technic of that time, was without recurrence. This patient had been treated elsewhere for three months and the tumor continued to grow larger; fifteen days after he began to treat the case with a different technic the improvement was most marked. In a perithelial sarcoma of the entire inner canthus, with four full doses of the modern treatment in each direction the growth had almost disappeared at the end of three weeks. In a round-celled sarcoma in the ethmoidal region, in which operation was entirely out of the question, a good result was secured with the Röntgen ray treatment and there had been no recurrence. In a sarcoma of the forearm which had recurred after operation twice and which had been treated before by Röntgen therapy without effect, he had obtained good results. An injury four years later caused a recurrence of the growth. The patient was not treated with the Röntgen rays and succumbed to the disease. In a case of sarcoma of one side of the face a dermatitis on the opposite side gave a very graphic illustration of the penetrating power of the rays.

DR. ROBERT ABBE declared that he had been almost startled by the brilliancy of the exposition of the evening. We are certainly indebted to the speakers for their enthusiasm and their moderation, and it should be left to them to continue their investigation and to tell what could be done by their methods. Dr. Pfahler's demonstration of what he had accomplished in the treatment of sarcoma by the Röntgen rays well filtered made it evident that there was here a great field for work and that they had only scratched the surface.

In regard to the uterine work, Dr. Abbè said he thought this was a very difficult branch of radiotherapy. He had not pursued it elaborately but had practised the uses of radium in the heretofore uncontrolled diseases of this type. There was here and there a case where lasting benefit was obtained, but this occurred usually in the less malignant conditions. He had recorded one case of cancer of the cervix remaining cured for eight and one-half years. The pathology of cancer was unknown, but we know that there were many grades of malignancy, and what might effect a cure in one grade would not do so in another. Cancer was a growth of the weak cells, the less resistant cells, and hence the cancer cell can be overcome by forces that would not destroy the normal cells of the skin. The fact that papilloma of the vocal cords could be destroyed by radiotherapy while the vocal cords themselves were uninjured was a striking

illustration of this susceptibility of the weak cells and the resistance of normal tissue. The cancer cell was not only weak but there were varying grades.

Fibroids were amenable to radiotherapy in many instances, especially the mural types. The speaker cited two cases successfully treated by radiotherapy, one dating back to 1905, which he had recalled when Profs. Krönig and Gauss were speaking of their large repeated doses of Röntgen ray. One of these cases received but one treatment; 100 milligrams of radium in a tube was placed in the body of the uterus. It was left in less than twenty-four hours. The hemorrhage stopped and there was a gradual recession of the growth until at the end of five years but a small remnant remained. With many tumors it was best to give the correct dose and then to let the patient alone and not to see her; if one kept on irritating the growth it got worse. He believed that they had a vast deal to learn about dosage and would not be surprised if one massive dose and a long abstinence would be equally efficient in α -ray work.

This was not work for the general practitioner at the present time; he should let it alone and not make a failure of it. This field of work should not be entered upon unless there was a large amount of radium at one's disposal and a large number of cases under such conditions that they could be watched, and where there were opportunities to compare the results with those from a large number of surgical cases. The work should also be confined to those who could work without regard to financial reward, and he felt confident that if these precautions were carried out they could add much to their present store of knowledge.

DR. L. G. COLE, after expressing his gratitude to the speakers of the evening, said that although he could not speak as a gynecologist, all röntgenologists were deeply indebted to Dr. Krönig and Dr. Gauss for their development of and contributions to the cross-firing method. He emphasized the necessity for the use of a high vacuum tube for deep therapy, and the importance of keeping the tube at that vacuum.

Dr. Pfahler's remarkable work seemed to him increasingly valuable. His interesting case, which responded so quickly to correct treatment after the unfortunate results of inefficient radiation, showed that thoroughly competent men were required for therapeutic as well as for diagnostic work. He prophesied great success for röntgenologic therapeutics in the next five years, if its exponents adopted as a standard the skill exhibited at this meeting.

DR. SINCLAIR TOUSEY said it had been a great privilege to listen to the distinguished guests of the New York Academy of Medicine tonight. Professor Krönig and Dr. Gauss had been largely instrumental in spreading the knowledge of the curative effects of the α -ray in uterine fibromyomata. He considered it very important, however, that no one should carry away the mistaken idea that their method robbed the α -ray of the danger of overexposure or produced a radiance which might be safely applied by one unskilled in deep radiotherapy.

Dr. Tousey said that his own experience, dating back to the successful treatment of a case reported in the New York Medical Journal ten years ago, corroborated the fact of a curative effect, but led him to feel that the technic described this evening was not to be lightly undertaken by anyone possessing an *x*-ray apparatus but not especially experienced and skilled in the treatment of deep-seated lesions. There were two important factors in the radiotherapy of deep-seated lesions; one was the quality of the ray employed and another was the distance at which the radiating focus of the *x*-ray tube was placed. Dr. Tousey agreed with the essayists regarding the advantage of filtration, arresting as it did those rays which could not penetrate the most superficial tissues, and which could only add to the burning effect of the *x*-rays. But it would be a grievous error and lead to most disastrous results to interpret this fact as indicating that the rays which penetrated to and profoundly affected the deep tissues were without effect on the superficial tissues which they first had to traverse. This effect was present and was exceedingly destructive in overdoses. The danger would lie in the assumption that filtered *x*-rays could be applied to the skin *ad libitum* or at least without an exact measurement of the erythema dose of these rays. In his practice he carried the exclusion of the less penetrating rays one step further by using a generator of his own suggestion, which sent a constant current of a suitable voltage through the *x*-ray tube and so produced approximately homogeneous *x*-rays of the desired penetration. He used filtration as an additional precaution. The essayists' practice of making the distance very short, he disapproved. Economy of time was unquestioned, but to produce an effect upon tissue 4 inches below the surface with the anticathode 5 inches above the surface, the skin would receive about twice the dose to which it would be exposed if the anticathode were 13 inches from the surface, with an exposure enough longer to produce an equal effect at a depth of 4 inches.

Röntgen ray ulcers had been reported from Germany as a remote effect of the technic under consideration. It was probably true that every *x*-ray ulcer from therapeutic or examination exposures about which he had been consulted had occurred from the *x*-ray tube being too close to the surface, in comparison with the depth of tissue and the power required to penetrate it; or from the operator applying more power than he was accustomed to, or of which he knew the safe dose. Mark the last phrase, the "safe dose." No man should apply a radiance for treatment or examination unless he knew how to measure its dose and had calculated its dose for the distance at which it was proposed to place the tube. Anything else was like giving a man a hypodermic of strychnine without knowing the strength of the solution.

DR. ARTHUR F. HOLDING said that this meeting had given him great pleasure not only because of the epoch making work shown by Profs. Krönig, Gauss and Pfahler, but also because it afforded him the opportunity of witnessing men who were not primarily röntgenologists become enthusiastic over results obtained by means of the

x-rays. It was a common belief in the medical profession (uttered louder than a whisper) that *x*-ray men were more enthusiastic over their results than the scientific facts would warrant. That the gynecologists, Profs. Krönig and Gauss, drawing their conclusions from such a large number of cases and after such painstaking research, had become more enthusiastic about *x*-ray, mesothorium, and radium results than röntgenologists would dare become in open meeting, was a rare tribute to the efficacy of these agents.

Profs. Krönig and Gauss had taken up this work after Prof. Albers-Schoenburg had reported his results in gynecological cases, and after such men as Prof. Pfahler had started doing this work, but the total number of successful cases treated by Krönig and Gauss (350 at the present time) was greater than the combined total of all the cases treated by the men whose work antedated that of Krönig and Gauss. The reasons for this were: First, because of the ability, character and attainments of Krönig and Gauss and the fact that as well as being trained surgeons, they were progressive enough to recognize and make use of such new agents as *x*-rays, mesothorium and radium; second, because their scientific study of the subject enabled them to improve upon the technic of the application of these remedies and report their results in a convincing manner; and third, and perhaps not least, because *they had control of their cases*.

This was a clear indication of what brilliant results might be expected in all specialties when new agents that were now known but not fully utilized should be carefully adapted to the special problems of each specialty by men who were cognizant of these conditions, and could control large enough numbers of patients afflicted with the same pathological conditions.

Publicity should be given this work that it might be generally known what could be accomplished with large doses of Röntgen rays. Following this publicity there would no doubt be a great increase in the number of cases treated by these agencies, and along with the successes would come a new era of *x*-ray calamities, therefore it could not be insisted on too emphatically that all *x*-ray treatment was not good *x*-ray treatment, just as all surgery is not necessarily good surgery. The slogan of successful surgery was technic and likewise successful Röntgen therapy was entirely dependent on technic.

BRIEF OF CURRENT LITERATURE.

OBSTETRICS.

Blood Pressures in Normal and Abnormal Pregnancies and Labors.—M. Donaldson (*Journ. Obst. and Gyn. Brit. Emp.*, 1913, xxiv, 133) finds that during normal pregnancy there is no increase of blood pressure, nor is there any fall immediately after labor. In cases of albuminuria complicating pregnancy, the most striking feature is the high systolic pressure. In purely toxic cases the pressure tends to fall quickly to normal after delivery. How far

it is possible to diagnose the presence of a previous renal lesion by the fact that the pressure does not drop so low, it is, at present, difficult to say. In the question of treatment, the observations on blood pressure seem to be of some importance. A rising blood pressure in spite of treatment is certainly an indication for terminating the pregnancy.

Duration of Interval between Insemination and Parturition in Certain Mammals with Reference to Calculation of Onset of Labor in Human Pregnancy.—J. B. Hart (*Edin. Med. Jour.*, 1913, xi, 291) states that the duration of pregnancy in any mammal is not known, as the date of conception, by our present means of investigation, cannot be ascertained. In calculating the date of labor we must put out of the calculation any thought of the duration of pregnancy. The initial date for the calculation of the date of labor in the human female should be the first or last day of the last menstruation. Additional data are still required to fix which is the more reliable initial date. Midterm quickening may be used for corroboration in doubtful cases, but is not as a rule reliable by itself, owing to the mistakes that may be made by the patient. Tessier correctly suggested in 1819 that the period of gestation and therefore, logically, of the date of labor varied, and that an exact date of labor could not be predicted. Dates of labor in sufficient numbers plotted out in curves give approximate frequency polygons, usually skew. The greatest number of cases of labor in Tessier's ewe cases occurred between the 149th and 153rd days. Agriculturists usually reckon utero-gestation in sheep as a five months' one. In Spencer's cattle statistics the greatest number of labors occurred between the 281st and 289th day (530 out of 764 cases). Tessier's cattle cases give an analogous curve. The date of labor in mammals is therefore a varying and not an exact one, and the greatest number falls within certain definite days. A long insemination- or menstrual-labor period does not necessarily mean a prolongation of the duration of pregnancy. The alleged greater size of the fetus in long insemination-labor periods is not yet accurately proven, and is not supported by Spencer's and Tessier's results.

Symmetrical Necrosis of Cortex of Kidneys after Delivery.—H. D. Rolleston (*Lancet*, Oct. 25, 1913) records a case of symmetrical necrosis of the cortex of the kidneys directly after childbirth, the eleventh in the literature. He says that symmetrical necrosis of the renal cortex is almost invariably related to recent delivery, and the child is almost always stillborn. The symptoms resemble those of obstructive anuria, but uremic manifestations are not entirely absent. The kidneys may have been previously either healthy or diseased. The necrosis of the cortex is a characteristic lesion, and is intimately connected with thrombosis of the interlobular renal vessels, but the exact relation between these two events is open to discussion.

Decidual Reaction in Vermiform Appendix in Intrauterine Pregnancy.—G. W. Outerbridge (*Jour. A. M. A.*, 1913, lxi, 1702) describes the pathological condition found in two appendices removed on account of acute inflammatory attacks which occurred during

intrauterine pregnancy. Scattered throughout the greatly thickened subperitoneal tissue were numerous groups of large, polygonal cells. In some areas these large, very prominent cells showed a more or less diffuse arrangement, making up practically the entire tissue, but for the most part they were collected into fairly definite groups, the majority of which were situated beneath the surface, one or two, however, projecting slightly above it. In the center of a few of the cell groups were a number of good-sized, engorged capillaries, but in the majority these were wanting, the cell masses being for the most part compact, and showing no relation to blood-vessels. A delicate fibrous network could be made out between most of the cells, and the entire arrangement was practically identical with that of ordinary decidua, although the development was nowhere so extensive as that regularly found in the endometrium. Loeb's theory is that the corpus luteum elaborates a sensitizing hormone, under the influence of which the stroma-cells of the endometrium react to any nonspecific irritation—such as the introduction of a small foreign body into the uterus—by the formation of a decidua, the necessary irritation being furnished under normal conditions by the lodgment of the fertilized ovum. If the presence of such a hormone can thus sensitize the stroma-cells of the uterine mucosa, it may be assumed to exert a similar influence on the connective-tissue cells of other areas, so that when acted on by any sufficient irritant, they too will undergo a similar transformation—less well-developed, however, inasmuch as this tissue is not so well adapted to undergo the characteristic changes as is the loose endometrial stroma. The fact that in addition to the presence of the sensitizing hormone, this second factor of local irritation appears to be necessary to cause any considerable decidua formation, would seem to furnish a sufficient explanation for the occurrence of this in scattered patches rather than diffusely; only at those points at which some slight mechanical or other stimulus is active do the cells undergo a decidual change. In the case of the appendices described in this paper, the intense inflammation present undoubtedly furnished the irritative stimulus necessary to produce the reaction.

Influence of the Thyroid on Pregnancy and Lactation.—Thompson (*Surg., Gynec. and Obst.*, August, 1913) has correlated the clinical evidence on this subject thus far obtained to which he has added the results of personal animal experiments. The latter included operations on nine pregnant dogs in which one or both lobes of the thyroid were removed. It was found that in the former class normal puppies were born and an abundant milk supply resulted. In one dog in which the remaining thyroid was bruised, a stillbirth resulted and the animal died. In another in which the entire gland and likewise the parathyroid tissue was removed, symptoms of tetany resulted, five living puppies were born but no milk appeared and both the mother and the offspring died in a few days. The removal of one thyroid lobe seems therefore to have little influence on pregnant dogs or their puppies but the removal of one-half, with injuries sufficient to destroy the function of the remaining part of

the gland and parathyroid tissues, is followed by tetanic seizures and the death of the mother and puppies. The total removal of the thyroid with some parathyroid tissue, is followed by trembling, rigidity, scant milk supply and later death of mother and puppies. The writer concludes that there is sufficient clinical and experimental evidence to show that a lack of thyroid secretion influences sexual activity adversely; that sexual activity whether physiological or pathological, causes a hyperactivity of the thyroid, and that this hyperthyroidism constitutes an index to the toxemia of pregnancy to counteract which the thyroids raise their antitoxic protective power. Moreover, it is thus probable that what is termed a physiologic hyperactivity of the thyroid is a valuable safeguard against the toxemia of pregnancy.

The Relations of Pyelitis to Pregnancy.—Mayer (*München. med. Wchnschr.*, July 8, 1913) claims that pregnancy is not the essential cause of pyelitis but simply offers a certain predisposition to the development of the same. He believes that the ascending type of infection is rare but that the condition originates through the circulatory or lymphatic systems. It is well known that in the presence of a bacteremia, germs may find their way into the kidney although migration through the lymphatics from the intestinal tract is not generally acknowledged. Lymphatic connections between the right kidney pelvis and the colon have however been demonstrated and probably account for the greater frequency of right-sided pyelitis. The normal intestinal coat does not allow the migration of the colon bacillus, but Mayer believes that observation will demonstrate that most cases of pyelitis are preceded by acute gastrointestinal disturbances. The appendix if diseased probably also plays an important rôle in the etiology of pyelitis, for urologists generally acknowledge the association between appendical inflammation and vesical tenesmus, pyemia and hematuria. As regards the influence of pyelitis on pregnancy, the author found that about one-third of the cases observed in Sellheim's clinic were delivered prematurely, due either to the temperature or the absorption of toxic products. The differential diagnosis between pyelitis and other conditions likely during pregnancy is often difficult. We must consider appendicitis, various puerperal infections and acute diseases of the respiratory tract. One or more of these may be associated in a single case.

Retroplacental Hemorrhage.—Elis Essen-Möller (*Arch. mens. d'obst. et de gyn.*, Oct., 1913) gives as symptoms of retroplacental hemorrhage violent abdominal pains, with symptoms of shock, abnormal sensibility of the abdomen, and in the case of large hemorrhages a fluctuating tumor of the uterine wall. The fetal parts cannot be felt, and there is a disproportion between the gravity of the condition and the smallness of the amount of blood lost. Pathologically there are found inflammatory lesions of the placenta followed by degeneration, but these lesions are not constant and may result from other conditions. Hemorrhages into the uterine muscle are frequently found. As to causation the author admits traumatism

but not as a frequent factor, shortness of the cord he rejects. Nephritis is not a cause, because such hemorrhages occur only in the interstitial form and the nephritis of pregnancy is parenchymatous. In the author's own experience out of 7000 deliveries, at the Hospital of Lund, albuminuria was found in 11 per cent. of cases, while hemorrhage occurred in only 0.15 per cent. Thus nephritis is much more common than hemorrhage. The author believes that the nephritis and the hemorrhages are both results of the same general intoxication. The maternal mortality may be considerably reduced by rational treatment. Obstetrical treatment consisting in tamponing the uterus and vagina may be of value in some cases. The value of rupture of the membranes can be appreciated only after having tried it in a particular case. Often this may be sufficient. Dilatation of the cervix should be used in severe cases, or if not effective a Cesarean section may be done for rapid delivery. It is not necessary to remove the uterus unless it fails to contract or hemorrhage persists after removal of the ovum.

GYNECOLOGY AND ABDOMINAL SURGERY.

Histogenesis of Cancer of the Breast.—W. C. MacCarty (*Surg., Obst. and Gyn.*, 1913, xvii, 441) has made a study of 1000 amputated or excised human breasts removed for various conditions. He says that there is a definite pathologic foundation for the surgical experience that the conditions described as "senile parenchymatous hypertrophy," "abnormal involution," "cystadenoma," and "chronic cystic mastitis" are often, if not always, associated with carcinoma. In a single specimen may be seen the stages through which this association probably takes place. One also finds histologic pictures in specimens of carcinoma which correspond to those described by many writers as "cystadenoma," "papillary cystadenoma," "intracystic epithelioma," "Schimmelbusch's disease," "chronic interstitial mastitis," "chronic cirrhosing mastitis," "chronic cystic mastitis," and "polycystic epithelial mastitis." Carcinoma is apparently an outgrowth of the outer row of cells of the acini and not of the secreting cells, and also is not the product of "cut off" epithelial cells by scar tissue, but is derived from the stratum germinativum. The cells of the outer row of the acini form the growth into the lumen described by Schimmelbusch as cystadenoma. The proliferating cells of the acini—whether these acini are cystic or not after the disappearance of the inner row of cells—present the same irregularities of the nuclei which are seen in the cells which have invaded the stroma, lymph spaces, and lymph nodes. They are irregular in size and shape beyond the normal limits of size and shape of the normal cell. This irregularity is present in the acini, the so-called "basement membrane" of which is still intact. The practical question, therefore, arises: Is it necessary to wait for the penetration of the "basement membrane" before making a diagnosis of carcinoma? From the standpoint of the general pathologist this may be necessary, but if the surgeon

waits for such a change he will be basing his procedure upon a definition of carcinoma which does not consider the same characteristic in the cells before and after the penetration of the "basement membrane" distinctive of carcinoma. A careful and detailed study of carcinoma cells, "cystadenoma" cells, the hyperplastic epithelial cells of fibroadenoma and of chronic cystic mastitis has demonstrated that the resemblance between these cells is so great that if the desired therapeutic effect is to be accomplished, more "benign" tumors (fibroadenoma, adenofibroma, and cystadenoma) must be completely enucleated and more breasts diagnosed as "chronic cystic mastitis," "abnormal involution," or "senile parenchymatous hypertrophy" must be completely removed. On account of the close morphologic relation between these conditions the diagnosis must be made and the therapeutic measures carried out early in order to save the patient from the ravages of the extensive hyperplastic migratory epithelial conditions which we call carcinoma. Gross diagnosis, even by an expert, can be made in only a certain percentage of cases. The early change is microscopic, especially in fibroadenomata and chronic cystic mastitis. Carcinoma occurs in a wide range of ages. The youngest of this series was aged twenty-three years, the eldest seventy-two years and the average age was forty-seven years. The youngest "benign" fibroepithelial tumor occurred at nineteen years, the eldest at sixty-five, and the average thirty-three years. The surgeon as well as the pathologist should look upon the histogenesis of carcinoma as a process which apparently bears a most striking relationship to circumscribed and diffuse cystic or noncystic fibroepithelial hypertrophies and hyperplasias of the breast.

Abdominal Incision in the Treatment of Ovarian Cysts.—P. B. Bland (*Surg., Gyn. and Obst.*, 1913, xvii, 576) says that cystic growths of the ovaries should be removed entire through an abdominal incision sufficiently long to accomplish their delivery. Puncture and withdrawal of the cyst contents through a small incision is unsurgical and inconsistent with our present understanding of surgical principles. Tapping or puncture of these growths is associated with a danger, not only of infection, but of the dissemination of malignant processes. It is impossible for the operator to positively differentiate the various types of ovarian tumors by their color. The small incision, with incision-puncture, should only be employed in very exceptional cases and never where extirpation of the tumor entire can be performed through a large abdominal incision. The old operation should find but little use to-day because the gigantic growths which were encountered by the men who devised the operation of ovariectomy are now rarely seen. The operation should be performed only through the abdominal route. Vaginal ovariectomy should find an extremely limited field of usefulness, and this operation, too, should be performed only in instances where the tumor is freely movable and can be delivered without tapping or without puncture or without the danger of rupture. The latter is favored by the increased manipulation the vaginal route entails.

Hernia of the Uterus and Both Adnexa.—L. K. P. Fararr (*Surg., Gyn. and Obst.*, 1913, xvii, 586) states that there are two varieties of hernia of the uterus and both adnexa, inguinal and femoral, the former being by far the more common and the only one in which hernia of the pregnant uterus has occurred. Of inguinal hernia of the uterus there are two types, congenital and acquired, the latter infrequent. Hernia of the uterus occurs in infancy, usually associated with genital malformations, or in adult life after numerous pregnancies. If it occurs between infancy and adult life there are usually hermaphroditic malformations. Hernia of the uterus is always secondary to hernia of one appendage, but a hydatid of morgagni or a fold of broad ligament may precede the ovary into the hernial ring. The diagnosis rests on symptoms which are connected with the pelvic organs and not with the intestine. The treatment is always operative, either on the pregnant uterus for the relief of the immediate condition, or on the nonpregnant uterus to prevent degenerative changes in the organs or to avoid the dangers of pregnancy in a hernia sac. The causes are probably not single but several associated. Adhesive peritonitis in intrauterine life produces malformations and displacements of the genital organs which render them more liable to hernia. The processus vaginalis peritonæi makes an opening favorable for a hernia. In the majority of cases occurring in infancy or childhood it is probably intraabdominal pressure that is the immediate cause of the hernia. In cases occurring in adults multiple pregnancies, subinvolution of the uterus and adnexa or a previous inguinal hernia of the intestine are the secondary causes favoring its formation. In some cases it is apparently the round ligament that draws the ovary as the gubernaculum of Hunter draws the intestine into the inguinal canal. In certain other cases it seems probable that the broad ligament may first become adherent to the internal ring or to the processus vaginalis peritonæi and form a reduplication, and so draw the ovary in by a mechanism analogous to the gliding hernia of the large bowel. If intestine or omentum to which an ovary is adherent is in the hernial sac it seems only logical to consider that the ovary which has made its descent into the inguinal canal, in a manner analogous to the testicle, has in the same manner as the testicle dragged a loop of bowel after it into the hernial sac, the ovary being therefore the origin of the hernia and not the intestine.

Irregular Kidney Vessels.—In fifty cadavers, R. R. Rupert (*Surg., Gyn. and Obst.*, 1913, xvii, 580) found that 35, or 70 per cent., showed a unilateral or a bilateral anomaly of the arteries or the veins, or both. Anomalous veins are as important to consider as anomalous arteries. While they are not as frequent as anomalous arteries, their presence increases the hazards of renal operations, especially in a nephrectomy. On account of the thinness of their walls they give but little, if any, more resistance to traction than a small adhesion, and as pulsation is absent, an anomalous vein is difficult to differentiate from an adhesion, unless it can be drawn into the field.

Abdominal Adhesions.—As regards the prevention of adhesions, R. C. Coffey (*Jour. A. M. A.*, 1913, lxi, 1952) states that the choice between the wet and dry pad is not vital, if equal care is used in their use. Oils and all lubricants are worse than useless in the prevention of adhesions. Specially prepared membranes and other foreign bodies have not proved equal to the claims of their advocates. Cathartics following operation probably do more harm than good as a rule, although at times they may be of benefit. The production of adhesions may be minimized by thorough asepsis, as little handling as possible, and avoidance of traumatism and exposure to the air. The methods of treating troublesome adhesions, which seem to be based on sound principles, are as follows: Cover all denuded areas with adjacent peritoneum as far as possible, either to prevent or cure adhesions. This may be done (*a*) by simply bringing peritoneal edges of denuded areas together; (*b*) by rolling the intestine partially in its own mesentery; (*c*) by splitting the mesentery into its two leaves and bringing one leaf up over the denuded surface of the intestine. If a sufficient quantity of adjacent peritoneum is not available, a part of the omentum or mesentery may be inserted between the two organs and fastened by sutures. If peritoneum and fat are not conveniently available, the next step is to hold the organ away from the point of attachment, after the adhesions have been cut, by shortening its normal supports, or by suturing the organ or its supports to some other peritoneal surface in such a way as to assure proper function to the organs involved. In cases of excessive adhesions in the pelvis or other parts of the abdomen, in which a loop of intestine goes into a mass of adhesions and emerges, leaving plenty of clear intestine above and below, by far the best plan is to leave the adhesion alone and short-circuit by making a lateral anastomosis between the two limbs. The writer submits a method of treating adhesions in well-marked adhesion-forming patients, in whom adhesions recur after operation, in increasing quantity. It is the insertion of a gauze pack protected by rubber tissue. All the intestines must be temporarily packed far away from the infected or denuded area or organ. Gauze wicks the size of a finger should be laid straight, side by side, reaching entirely across the abdomen and coming out through the drainage opening. Four or five layers of gutta-percha tissue are then placed above the gauze and allowed to come out through the opening also. The intestines are now allowed to come down against the rubber tissue. The omentum is drawn down, and if long enough is interposed between the rubber tissue and intestines. The pack is brought out at the lower angle of the wound, and the upper part of the wound closed snugly around it, with combined layer and through sutures. It is better to attempt to remove half or all of the gauze wicks about the sixth or seventh day after the drain is placed and the rest about three days later. The rubber tissue is removed between the tenth and fourteenth days and a small soft-rubber tube takes its place for a week or ten days.

DEPARTMENT OF PEDIATRICS.

ORIGINAL COMMUNICATIONS

PRENATAL CARE.*

BY

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IN its wider scope prenatal care should give to the unborn child a reasonable assurance that it will be wellborn and that it will get a fair start in life, by preventing the marriage of men and women who are physically, morally or mentally unfit to become fathers and mothers, and by doing, besides, all that which constitutes "prenatal care" in the limited sense in which we are to consider it this afternoon.

In this limited sense the unborn child is cared for by watching over the health and the comfort of the expectant mother; by preparing her for her maternal duties, especially for the duty of nursing her child and by making adequate provision for the safety of mother and child during delivery and the lying-in period.

In this latter sense prenatal care is as old as the human race, but the term prenatal care and especially the term prenatal nurse, are quite modern.

The study of the causes of infant mortality, to which your society is devoted, has attracted public attention to the fact that the greatest number of infants who die under one year of age, do not live to complete the first month of life, and that the causes, leading to this enormous death rate, are often in operation while the child is still in its mother's womb. More often such early death is due to injuries which the child has sustained at birth, or to lack of breast milk and proper care during earliest infancy.

Attention having been called to this important factor among the causes of infant mortality, it was natural that the proper care of expectant mothers, including adequate provision for confinement and the puerperal state, should have been suggested as a preventive

* Read at the Annual Meeting of the American Association for the Prevention of Infant Mortality, Washington, D. C., November 15, 1913.

even by those, who were primarily interested in the reduction of infant mortality alone. It was then that the new terms were coined and that the prenatal nurse made her appearance.

The experimental work, started by the Committee on Infant Social Service of the Women's Municipal League of Boston four years ago, has done more than any undertaking in America to call attention to the great possibilities for good in such prenatal work, and to point out some of the obstacles which will have to be removed before the benefits of competent prenatal care can be shared by expectant mothers in every part of our country.

The work consists principally in placing pregnant women as early as circumstances permit under the care of competent visiting nurses who devote their entire time to the work of instructing these women in the hygiene of pregnancy, and who see to it that these instructions are carried out.

The propaganda in favor of prenatal care, to which the results of this work have inspired the members of the Women's Municipal League of Boston, has been and continues to be a wonderful help to the various agencies which have been engaged for some time in efforts to raise the standards of obstetrical teaching and of obstetrical practice in America.

This is all the more gratifying when we consider that the League has selected for its experiment a locality and a group of expectant mothers, which are not at all suited to demonstrate the fullest possibilities for preventing invalidism and for reducing the death rate among mothers and babies contained in adequate prenatal care.

The mothers experimented on were all women who had already placed themselves under the care of competent obstetricians, which after all, is or should be equivalent to securing all that most up-to-date prenatal care has to offer. These women were all registered for delivery at the Boston Lying-in Hospital or at the Massachusetts Homeopathic Hospital, and they belonged to the enlightened class, who had expressed the desire to be delivered in those institutions in preference to their own homes.

When those of us who are reasonably familiar with the character of obstetrical work and teaching in America, lament the fact that, in spite of the safeguards which modern obstetrics provides for child-bearing women, the great majority of expectant mothers in this country do not benefit by these provisions, we are not thinking of the poorer classes in cities such as Boston, but we are thinking of the entire population of every county in the United States.

In some of our cities, which are blessed by being the homes of great medical and obstetrical centers, the poorest part of the population and the wealthiest part of the population are able to secure pretty good obstetrical care in the fullest sense of the word; this portion of our population, therefore, furnishes only a very small percentage of the thousands of women and of the tens of thousands of infants, who die every year in the United States in connection with child-bearing from causes, which in the majority of cases reasonable obstetrical care would have prevented. Nor does this fortunate portion of the population of these fortunate cities furnish a considerable percentage of the incomparably larger number of mothers and infants, whose health becomes permanently impaired from these same preventable causes.

Let us state the case plainly: more than nine-tenths of all expectant mothers in the United States receive no adequate prenatal care; more than 40 per cent. of all confinements in the United States are attended by male or female obstetricians, who are not qualified to give to parturient women a full share of the safety and comfort which modern obstetrics makes possible, and which ought to be the birth-right of every expectant mother and unborn child.

To be still plainer: many thousand women die following confinement, because they have been septicallly infected by incompetent obstetrical attendants; other thousands die or suffer impairment in health, because incompetent obstetrical attendants have caused inexcusable injuries to the mother's body during delivery, or have brought her to the brink of the grave by improper management of the third stage of labor; thousands of children die during delivery, because obstetrical attendants are unable to make a correct obstetrical diagnosis, and in consequence thereof crush out the life of the child by brute force in ill-directed efforts at delivery, or, what is worse, improper application of the forceps causes injuries to the fetal skull, which result in mental deficiency or epilepsy, and make many of these infants a charge on the community and permanent inmates of public institutions.

Great numbers of infants are reported stillborn, because the obstetrical attendants are not skilled in the most efficient methods for reviving infants born in asphyxiated condition. The institutions for the blind are filled with people whose eyesight has been lost during earliest infancy, because the obstetrical attendants were neither skilled and conscientious enough to prevent ophthalmia, nor were they skilled and conscientious enough to cure the disease before it caused irreparable damage.

This represents a fair estimate of obstetrical work in the United States; excellent in places, good in a considerable percentage, and absolutely bad in about 40 per cent.

Before examining the causes of this deplorable state of affairs let us take comfort in the fact that these causes are not specifically American; that the same or worse conditions exist the world over, including such countries as Germany and England, and that in the United States conditions are improving more rapidly than in other countries.

There are three causes responsible for the poor care bestowed on expectant mothers. These three causes are: ignorance and indifference of the laity concerning this entire matter; indifference and carelessness on part of the states in the supervision of medical schools and of schools of midwifery, and neglect on the part of communities in not providing systematic care for all the sick poor, including expectant mothers. This latter cause is specifically American.

Concerning the first cause, it may be said that it really constitutes the only obstacle to bringing about the desired reform; for just as soon as the women of America realize the enormity of the crime which is being committed against the expectant mother and her unborn child, they will force the speedy removal of all the other causes by united and persistent effort.

Tradition and ignorance are alike combined in spreading the fable that child-bearing is a physiological process; that since the existence of the world generations after generations have been born and the race has multiplied in spite of the total absence of modern obstetricians, and that the Indians and other people living in a state of nature get along mighty well without special obstetrical care, and the story of the squaw, who loiters behind a band of Indians, who delivers herself by the roadside, mounts her pony and catches up with her friends, is told time and again as a convincing proof against the necessity of treating expectant mothers with particular care.

It is perfectly true that we cannot improve on the workings of nature; if we were to dispense with prenatal care entirely and were to leave the women to deliver themselves as best they can, the race would not suffer, in fact, it would be greatly improved and it would go on multiplying; all those that are handicapped would be eliminated, and, if we were to hasten the process by treating all delicate or defective infants with Spartan kindness, we would have a splendid object lesson of the way in which nature works out problems in eugenics.

I have in my collection the uteri of two women from the isle of

Guam, sent to me by a medical friend in the United States Navy; both of these women died undelivered; they had been unattended except by their own people; the one died of placenta previa, and the other on account of a face presentation.

Another tradition which ought to be stamped out is that women have to suffer untold agonies in bearing children. It is true that uterine contractions are necessary and wholesome, and a certain amount of discomfort or even pain is unavoidable. It is likewise, true that the indiscriminate administration of anesthetics during labor often causes relaxation and hemorrhage after the child is born. On the other hand, with a first child, no matter how easy may be the confinement, there is almost always considerable suffering; the pain becomes excruciating at the moment when the head is born, and there is almost always some injury to the maternal passages. To give primiparous women enough chloroform or ether to make them insensible to this severe final pain of the first confinement, and to enable the obstetrician to repair the injured parts before the woman recovers consciousness, is not only permissible, but should constitute a part of obstetrical routine.

To spread information regarding prenatal care, and thereby to dispel the ignorance and indifference of the laity on this subject, and to enlist its cooperation in efforts to bring about state and municipal legislation for the improvement of obstetrical conditions, must be the work of publicity campaigns and of object lessons, such as are carried on by the Women's Municipal League of Boston. The spread of such intelligence is rendered more effective and begins to reach a great number of women all over the country by the timely publications of the Children's Bureau of the United States Department of Labor.

Regarding the indifference and the neglect of the various states of the Union in failing to provide efficient control over medical schools and over schools of midwifery, and in failing to subject candidates for license to practise obstetrics to reasonable practical examinations, it may be said that, as far as medical schools are concerned, most states are now beginning to exercise such control, and that State Board Examiners are getting more and more rigid in the examination of candidates for license to practise medicine. The majority of these boards require that candidates for examination be graduates of medical schools in good standing; and very few boards consider a school in good standing, which does not give practical bedside instruction in obstetrics. It is different with the control of so-called schools of midwifery.

The fact that a few states arrange for the examination and registration of midwives, and that some states require that candidates shall be graduates of duly incorporated schools of midwifery, does not atone for the fact that some states especially exempt midwives from all provisions of medical practice acts, and insist that they can practise without license and control, nor does it atone for the fact that not one single state in the Union has control over schools of midwifery in regard to the character of instruction and the requirements for admission.

The cry is raised now and then to abolish the midwives entirely; those who raise that cry forget that the obstetrical service, rendered to a large portion of our population, will not be improved by supplanting ignorant midwives by equally ignorant doctors, especially when the ignorance of the doctor is so much deadlier than that of the midwife. The doctor comes in contact with a greater variety of infectious material, and, by being more active in the application of instruments, he can do much more harm than can an equally ignorant midwife. Nor will it help the poorer population if we supplant a five- or ten-dollar midwife with a fifteen- or twenty-five dollar doctor; the former, at least, acts as a cheap visiting nurse and takes care of mother and baby for a few days, while the latter requires the services of some other person for the work usually done by the midwife.

A simple and efficient means to do away with midwives without making martyrs of them and without working a hardship on a certain part of the population, consists in getting the same kind of state control over schools of midwifery and the admission of midwives to practise as is exercised over medical schools and the admission to medical practice.

Demand that these schools do a reasonable amount of bedside teaching, and that they train their pupils sufficiently to enable them to give safe and intelligent obstetrical service. This can only be done if certain entrance requirements are insisted upon, and eventually nothing short of a four year's high school education ought to be accepted.

This would, most likely, close those schools for lack of applicants; young women with such preliminary education, would much prefer to enter a training school for nurses and engage in one of the many special fields to which the course in a nurse's training school has become the stepping stone.

The present day midwife, of course, has no social standing, nor is her earning capacity very great if she limits herself to honest work.

Therefore, getting control over schools of midwifery and providing reasonable entrance requirements for them, will very likely drive these schools out of existence.

Those midwives, who are now practising, will soon be driven to less harmful employment. In the cities the development of well-organized obstetrical dispensary services with a system of visiting nurses before and after delivery, is already driving the midwife out step by step, and in the country the same may be expected from the activities of rural nurses, who are getting to be great factors for good in every remote corner of our country.

It should be said right here, that the most effective agents for spreading needful information among the people regarding prenatal care and similar topics, are the graduates of our nurses' training schools. Even at present a well-trained nurse makes a much safer obstetrical attendant than the best midwife, and, by giving some members of this intelligent class of workers a little special instruction they can be fitted to supplant midwives in the rural districts.

The midwife question in America is not as difficult to handle as it is in some other parts of the world. In Germany, for instance, the midwives continue to be of such low general education that they cannot be entrusted with the use of the most potent antiseptics, nor with the use of the hypodermic syringe, nor with the administration of chloroform or ether, and, since they are the only obstetrical attendants for the largest portion of the population, the women entrusted to their care must go on with the traditional suffering, and in many instances they must go on without timely repair of perineal lacerations, and all this, because the government cannot impose reasonable entrance requirements without changing the entire system of rural midwives (*Gemeinde-Hebammen*). Each village is required to maintain a midwife who takes care of the village poor. For this work she receives annually certain emoluments from the community; for services rendered to villagers not on the poor list, the midwife receives a modest fee. Her training she has obtained in a government school for midwives at the expense of the village. When it becomes necessary to have a successor trained for such a village midwife, the mayor selects the most suitable one from the village-bred applicants for the position. Intelligence and education are not always in evidence. At two German universities, where village midwives receive their training, I have for four years given the candidates a preliminary examination in reading and writing, and have several times sent a candidate back to her village, usually with the result that she has returned in a few days with a

statement from the mayor that she was the smartest woman in the village, or, at any rate, among the applicants, and that we had better keep her, which of course, we did.

It is for such reasons that in Germany the entrance requirements for these schools must remain low, unless the government changes the entire system and makes the village support a well-trained midwife, who is not village-bred, just like most villages are supplied with fairly efficient school teachers, who are not village-bred.

We surely may hope to enlighten the laity on the benefits of prenatal care, and, we may, likewise, hope that in the course of time the entire country will be supplied with fairly well-trained obstetricians, but to make the blessings of adequate care during pregnancy, parturition and lying-in state accessible to all expectant mothers it will be necessary to arouse large and small communities to a realization of their solemn duty to provide such care for the poor at public expense and to appreciate the immense benefit to the community if it makes these blessings also accessible to those of moderate means by contributing liberally from the public funds to the upkeep of the institutions which take care of this class of cases at a price which is proportionate to their means.

So far I have not entered into the nature of prenatal care itself; it is not necessary to do so before this audience; but I do wish to emphasize certain points regarding the care of expectant mothers prior to confinement, and to show how that work has been carried on for many years by the obstetrical clinic of Washington University. The care of the dispensary patients should not differ from the care of private patients. There is, however, this difference: of the six or seven hundred obstetrical cases who register annually at our dispensary very few make application before the middle of pregnancy, and, therefore, do not receive the full benefit of prenatal care. On the other hand, my private cases, with few exceptions, apply as soon as their condition is known to themselves, and I am, therefore, responsible for any accident that may happen to them, if such accident could have been avoided by reasonable prenatal care.

At the time of registering, every pregnant woman should be examined as to the position and size of her uterus and the condition of surrounding structures, because now and then the ovum is implanted in the tubes and not in the womb; and timely detection of such ectopic gestation enables the obstetrician to remove it before its rupture has brought the patient into imminent danger.

Such early examination, likewise, reveals existing malpositions

of the uterus; such cases at times need especial care until the uterus has fairly risen into the abdomen.

Every pregnant woman is instructed in the hygiene of pregnancy as far as diet, exercise, work and dress are concerned. She is particularly told to keep all organs of elimination in perfect condition; that is to say, to keep the bowels open; to keep the kidneys flushed by drinking plenty of pure water, and to keep the pores of the skin open by frequent bathing or washing. She is told to submit a specimen of urine once a month up to the middle of pregnancy, and twice a month after that period.

Her attention is drawn to the significance of certain symptoms, such as persistent headaches, disturbed vision, edematous swellings, or escape of blood, and she is requested to report at regular intervals at the dispensary. Toward the end of pregnancy special attention is paid to the care of the nipples, and the skin of the abdomen. The condition of the pelvis is ascertained in every case by careful and repeated pelvic measurements. The cases are assorted according to pelvic conditions, and all those in which trouble may be expected are requested to enter the hospital at such a time as may seem best for delivering these particular cases.

All cases, no matter how normal conditions may seem, are examined about a week before their expected time, and, if in women first pregnant it is found that the presenting part has not entered the pelvis, these cases are, likewise requested to enter the hospital.

That toxemia and eclampsia are in large measure preventable conditions, is fully affirmed by the results obtained in our dispensary and in private practice; but even if preeclamptic symptoms have developed, timely recognition usually prevents the outbreak of convulsions, and at any rate, it enables us to meet the condition promptly and effectively.

Any one of these many advantages of prenatal care should insure its general introduction. The neglect of a physician to exercise reasonable care over expectant mothers, after they have placed themselves in his hands, should before long constitute an act of criminal negligence.

THE TOXIC ACTION OF PITUITARY EXTRACT UPON
THE NEWLY BORN, APPARENTLY THROUGH ITS
MOTHER'S MILK.

BY

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New York City.

A FEW weeks ago I was asked by Dr. J. L. Rubinstein to see a newly born infant in a state of tonic convulsions. The history of the case showed that the delivery was normal, though somewhat slow, and that, to counteract the inertia uteri, the doctor had within an hour administered two hypodermic injections of pituitary extract of 1 cubic centimeter each. The infant rested well after birth and partook of small quantities of water without the slightest difficulty until it was put to the mother's breast about eight hours later. It nursed about twenty minutes, became restless soon thereafter, and gradually was seized with recurrent attacks of muscular contractures. When two hours later it again was fed on the breast milk the spasms assumed a general character and rapidly became very severe. I saw the infant twelve hours after birth. It was free from any sign of injury either of the head or any other portion of the body, and was well developed physically. I found that the convulsive attacks returned every few minutes and consisted of firm tonic contraction of the extremities, flexion of the hands and feet, firm closure of the mouth and slow swaying of the head from one side to the other. Breathing was suspended and cyanosis was pronounced. Between the attacks the baby seemed perfectly normal. In view of the facts that there were no other signs or symptoms to account for the spasms, that these set in after partaking of the mother's milk and that the muscular contractures were tonic and set in at regular intervals (resembling uterine contractions), I concluded that the condition was probably due to the effects of the pituitary extract transmitted to the infant by means of its mother's milk. Accordingly I ordered temporary cessation of breast feeding and small doses of chloral and bromides. The convulsions ceased very gradually within two days and have not returned since.

TRANSACTIONS OF THE NEW YORK ACADEMY OF MEDICINE.

Meeting of December 18, 1913.

The President, WILLIAM M. POLK, M. D., in the Chair.

This meeting was held under the auspices of the Section on Pediatrics.

MEDICAL SOCIOLOGY IN THE PUBLIC SCHOOLS.

DR. MARY SUTTON MACY had been asked to tell what the public schools were doing for the physical care and welfare of the children, which should be known to the medical profession. The public schools of New York City were of two kinds: (1) The larger number, about 500 elementary schools and twenty-five high schools, supported by the public money under the Department of Education, and (2) the thirteen day schools and eight evening industrial schools maintained by the Children's Aid Society, with some cooperation from the Department of Education. Besides these there were parochial and other church schools which did not come within their summary at this time. The Children's Aid Society in addition to the schools mentioned maintained the so-called "Soup Schools" which provided lunches for children as well as clothing and other necessities. The Society also maintained dental clinics in connection with its schools and the teachers and social workers were most eager to cooperate with any suggestion offered by the clinics with which the speaker was connected. The Department of Education also effected a great deal of social service bordering on philanthropy in the course of its routine work.

Medical inspection in the public schools was under the Department of Health Bureau of Child Hygiene. The corps of doctors and nurses attached to this Bureau made regular and routine inspections of the children, or as many of them as possible, and succeeded in excluding almost entirely contagious diseases. They had in this city no serious school epidemics in these days and the Bureau deserved full credit for this relief. Many other points were included in medical inspection, defective teeth, palate, vision, hearing, nasal breathing, hypertrophied tonsils, etc. Recommendations for proper treatment were made or supposed to be made to the parents or guardians. The best results in this work were secured where there was cooperation between inspector, school authorities, and the home, but not always so good when one of the trio slipped in the cooperation, as was too often the case.

The remaining fields of medical sociological activity were entirely

under the direction of the Board of Education, if they excepted the school lunches which were served in twenty-two elementary schools of Manhattan and Brooklyn as experimental efforts to demonstrate their value and effect. Another field of work which should be mentioned was the new Department of Educational Hygiene being organized under Dr. Crampton, which it was to be hoped would take some effective notice of the hygiene of the teacher. Dr. Macy said she had elsewhere tried to point out the demoralizing effect on a whole school of a sick teacher. The children should be guarded from sick teachers without doing injustice or working hardship to the teachers. As a rule the teacher worked too long and returned too soon to work and it was usually a matter of financial necessity. It was time that physicians took a hand in the teacher's salary campaigns, for the sake of their own patients, both teachers and pupils.

Again there were special classes for the blind, the deaf, the crippled, the enemic, the tubercular, and those suffering from trachoma, all of which deserved the attention and cooperation of the medical profession. They all presented medical problems in which each and every physician should be interested and concerning which he should be well informed. The routine of admitting children to these classes should be known to every physician in private, hospital or dispensary practice, and the parents or guardians of such children should be put into touch with the educational people by the physician. The cooperation of the physician would be heartily welcomed, as would be his suggestions for care, treatment, nourishment, hygiene, etc.

The vocational training of boys and girls deserved medical inquiry and medical cooperation. Should it not be possible for a child physiologically more mature than his or her twelve chronological years would indicate to prepare himself in school for a congenial life work? Must he be compelled to stick to his books for two or four years more before he can begin to learn a trade and then begin without the protection and supervision that school training would give, and at the same time be handicapped by the bad habits acquired during the two or four years of laggardism or truancy? Why did not the doctors find an answer to this problem? The educators would act if the physicians could make them see.

Dr. Macy said that last she wished to speak of her own hobby, the classes for training nervous and backward and mentally defective children, the so-called "Ungraded Classes." There were no classes for epileptics, imbeciles or idiots, and there were no classes for the observation of nervous cases, or cases simulating amentia; neither were there classes for mental defectives or morons, but there were ungraded classes in which all these types of children were mixed together and unfortunately some persons had gotten the idea that every child in the ungraded classes was a moron, an imbecile, or an idiot. As a matter of fact the majority of children in these classes were borderline cases, or high-grade morons, and only time, treatment and teaching would determine which was which.

The time was coming when this field, so essentially medical, should have medical direction and be organized so that the present chaos of cases was sorted out and differentiated. This was an important and vital field for the physician to look into. This field required more practical medicine and less theoretical pedagogy than it was getting at present. For seven years past Dr. Smart had been examining children proposed for these classes and now these examinations were being made by two physicians and it was a medical examination and not an inspection to which the candidates were subjected. Recommendations were made that the child be taken to a specialist or to a clinic as circumstances warranted, and when the cases were once admitted to the ungraded classes they were followed up by social workers attached to the Department to see that the needed treatments were obtained. Convalescent homes in the country were secured for cases in which this seemed to be indicated and the children were followed up on their return to the city to insure the right educational treatment following the physical upbuilding. More clinics and more physicians should be interested in actively cooperating with the doctors in this department as it stood at present. Frequently there were cases which showed no marked defect and no pathological condition of special interest, but still such cases might require glasses, or removal of the tonsils and adenoids, or general tonic treatment for malnutrition, and all three should have medical care. Few physicians in clinics or out of them realized all the resources at the command of the poor of this city, and if there were more cooperation between the clinics and the physicians of the Department of ungraded classes of the public schools the physicians would learn many things that they did not know and the children would profit immeasurably.

Dr. Macy closed by making a plea that all clinics not only pediatric, but eye clinics, ear clinics, dental clinics, skin clinics, any clinic should offer its cooperation to this department of the school system, and urged that they receive all cases referred to them, report to the physician sending the case, the findings and treatment and suggest the hygienic cooperation that the school should give, and she assured her audience that they would be surprised at the results and the number and kind of cases that they would see.

A STUDY OF THE RESULTS OF TONSIL OPERATIONS ON PUBLIC SCHOOL CHILDREN IN NEW YORK CITY.

DR. GERHARD H. COCKS stated that this study was based upon the examination of over 100 children selected from the Department of Health records of cases recently operated upon in the local hospitals and dispensaries. The investigation was made under the direction of the New York City Visiting Committee of the State Charities Aid Association and its object was twofold: First to obtain information which would warrant a request for more funds from the Board of Estimate for the care of adenoid and tonsil cases in the municipal hospitals, and second, to ascertain whether any improvement could be made in the methods now employed in the schools for the disposition and treatment of these cases.

The children examined by the writer were treated or operated upon in one or other of about thirty of the local hospitals and dispensaries and were scattered among twelve schools in Manhattan. The number of children examined and referred for operation by the school doctor was 107, the number of children evading operation, seventeen; the number operated upon, ninety; those operated upon with general anesthesia, thirty-three; those operated without anesthesia, fourteen. In the remaining forty-three cases there was some doubt as to whether the children were given a general anesthesia or not. The ages of the children varied from four to fourteen years.

After explaining the method of school inspection, the writer said that if a child was found with diseased tonsils or other abnormal conditions, he was referred to the family physician or clinic for treatment. The medical inspector's findings were noted on a card and filed for future reference. As the law now stood the Department of Health could not legally compel parents to have their children operated upon. Last year there were 825,000 children enrolled in the public schools of New York and one medical inspector was allotted to every 9000 children. When one considered the large number of children examined annually by the Department of Health physicians and nurses, the difficulties encountered in the shape of opposition from parents, lack of proper examining rooms in the older type of schools, etc., it was evident that the Board of Health was carrying on a good and useful work.

There were certain defects found in the system, for example, thirty-one of the 107 children examined were suffering from nasal abnormalities either urgently requiring treatment, or where treatment would have been highly beneficial. Apparently these cases had been referred to clinics, their adenoids and tonsils removed but their nasal condition not attended to. So far as he knew the school doctor did not examine the anterior nares. A large variety of severe nasal conditions were noted in these children and a large proportion had carious teeth. Eighteen cases had high palatal arches, requiring correction either on account of improper development of the upper jaw and teeth, or on account of interference with nasal breathing.

The teacher's comments on the results of operation were interesting. In many cases they had noted that children were cured of recurring sore throat, earaches, mouth breathing, etc. In many instances the general physical and mental condition of the child was improved.

The soft parts were injured in nine of the ninety cases operated upon, some of the mutilations showing very bad surgery.

A comparison of the series of fourteen cases operated upon without an anesthetic with the series of thirty-three cases operated upon with general anesthesia showed that where no anesthetic was employed the results were uniformly bad, with one exception. In many of the cases portions of tonsillar tissue varying from small portions to nearly the entire tonsil still remained after the operation. Of the thirty-three children operated upon under general anesthesia the tonsil operation was well done in twenty-four cases, that was, the

tonsils were either completely removed, or an insignificant remnant of tonsillar tissue was left on one or both sides. An analysis of the remaining nine cases showed poor results in spite of the general anesthesia.

The writer had long felt that the performance of adenoid and tonsil operations upon children without general anesthesia was unnecessarily cruel. Unfortunately this practice was still in use in many clinics and dispensaries in New York City and throughout the country. Aside from the cruelty the figures quoted above were convincing that adenoid and tonsil operations on children without general anesthesia should be discontinued. It was impossible to effect a complete operation without the employment of a general anesthetic. Again the surgeon was far more likely to cause serious traumatism to the throat if he attempted to operate upon a struggling child. Moreover, the child was likely to receive a nervous shock from which he would suffer for a long time. It was to be hoped that all institutions where adenoid and tonsil operations could not be performed in a thoroughly surgical manner with general anesthesia would have the courage to close their doors to these cases until equipped to care for them properly.

Another matter which required correction was the practice of certain hospitals of charging from two to five dollars for a general anesthetic in these operations. While there might be a practical reason for this state of affairs, it was apt to strike the average layman that it placed a premium on suffering, corresponding to the patient's ability or inability to meet the expense. It seemed only fair to demand that public hospitals should either operate upon all cases without anesthesia or all cases with anesthesia entirely irrespective of the patient's ability to pay.

A circular letter was sent to the different hospitals and dispensaries with the object of ascertaining the length of time that the children were kept in the hospital after operation. Of these twenty-two replied, the replies indicating that nine lived up to their obligations and kept their patients approximately twenty-four hours or longer for observation and treatment. In four other institutions the children were allowed to go home directly after the operation, while in seven they were kept from one to twenty-four hours, usually from one to three hours. It was only too clear that where these cases were sent home in less than one day there was great danger of post-operative hemorrhage, pneumonia, or other complications.

Dr. Cocks concluded that (1) a greater number of medical inspectors was needed, (2) school physicians and nurses should exercise more care in seeing that children referred for operation carried out their recommendations, (3) when children were referred to hospitals or clinics they should be sent to institutions which maintained nose and throat departments, in order to avoid attacking the tonsils when the anterior nares were at fault, (4) hospital physicians should remember that a child referred from the school physician was often sent simply for diagnosis and treatment, such a card not being an indication that operation was imperative, (5) all adenoid and tonsil

operations on children should be done under general anesthesia, (6) hospitals doing these operations should be equipped to keep their patients at least twenty-four hours after operation, (7) a list of hospitals which employed general anesthesia and carried out proper after-treatment for their adenoid and tonsil operations should be compiled each year. This list should be given to the school authorities for use in directing pupils unable to pay for private operations. A committee appointed by the Academy of Medicine could be relied upon to draw up such a list on an impartial basis.

THE CHILD IN THE TUBERCULOUS MILIEU.

DR. MAURICE FISHBERG presented this paper which was based on a study of 217 families in which either the father or the mother, or both, were found to be tuberculous. These families were found living under conditions greatly favoring the dissemination of the disease. Of 274 consumptives found among these people, only 112 slept in a separate room, and 136 slept in beds by themselves; the rest shared their rooms or beds, or both, with other persons. Their economic condition could be summed up by saying that they were at the end of their resources, otherwise they would not have applied for relief. Inasmuch as these children were burdened by both a deleterious environment and a tainted heredity, they should offer splendid material for the study of the effects of the tuberculous milieu on children.

Of the 1129 persons comprised in this group of families, 692 were under fifteen years of age. Nearly all of these children were reared on breast milk, only 5.5 per cent. having been brought up on artificial food. The proportion reacting to tuberculin was not found to have been influenced by the manner of feeding during infancy. Some mothers suffering from tuberculosis were found suckling their infants and the latter apparently thrived as well as others of their class; most, however, infected them with active tuberculosis.

The weight of the infants was fairly normal, but the children over four years of age were deplorably short of weight when compared with others of their class. At the age of eight years, they lacked 3.67 kgs. and at fourteen even 7 kgs. on the average. During the six months they were kept under observation, one-half remained stationary in weight, 40 per cent. had lost and 10 per cent. had gained in weight. The form and shape of the chest was normal in 62.5 per cent. of the children; 27.5 per cent. had flat chests, and 10 per cent. had rachitic chests. The large proportion of flat chests was not necessarily an indication of the *habitus phthisicus* because Jewish people were known for their flat chests.

In 8 per cent. of the children, enlarged thoracic veins were found. In children in whom a diagnosis of tuberculosis was made, 37.5 per cent. showed these enlarged veins and three-fourths were unilateral. Of the children showing signs of latent tuberculosis, 25 per cent. had enlarged thoracic veins.

The cervical glands were swollen in 67.8 per cent. of the children;

swollen glands in the axilla, groin, etc., were exceedingly rare. Only one child was found with enlarged supraclavicular glands, and this child had other symptoms and signs of tuberculosis.

Hyperplastic conditions of the nose, throat, and pharynx, such as enlarged tonsils, adenoids, chronic rhinitis, etc., were found in 58.6 per cent. of the children. Scrofula was rather infrequent. This investigation tended to confirm the opinion that these hyperplastic conditions, as well as scrofula, had nothing in common with tuberculosis. The external stigmata of tuberculosis, such as scrofuloderma, tuberculides, phlyctenula, glandular blepharitis, conjunctivitis, keratitis, etc., were exceedingly rare among these children.

The cutaneous tuberculin test, applied twice and three times to those who reacted negatively to the first application, was found positive in 7 per cent. of the infants between one and six months of age. Between six months and one year of age, 21 per cent. of the infants reacted positively. The percentage of positive reactions kept on increasing with advancing age, and at fourteen years of age, 83.79 per cent. were found infected with tuberculosis. When compared with the results obtained by others who reported the application of the tuberculin test to a large number of children, it appeared that the tuberculous milieu had not materially increased the number infected with tuberculosis during the first fourteen years of life. In other cities it was found that about the same percentage, or even more, reacted positively.

Among the 692 children, sixty-five were found to be suffering from active tuberculosis. Of these thirteen had tuberculosis of the bones and joints, four Pott's disease, two spina ventosa, and one tuberculosis of the glands. With active pulmonary tuberculosis, nineteen were found, and twenty-five with tracheobronchial adenitis.

The mortality of children under fourteen years of age among these families was rather high. Of 229 children that had died, thirty-two succumbed to meningitis, that was, 17.6 per cent. of all the deaths of children under six years of age were due to meningitis, which was an enormously high mortality from this cause. Among the children in New York City the mortality from tuberculous meningitis was only 2 per cent. of the total deaths. While only 17 or 7.3 per cent. of all the deaths were said by the mothers to have been due to pulmonary tuberculosis it must be borne in mind that in seventy-nine cases the parents stated that the deaths were due to unknown causes. Many of these were undoubtedly due to tuberculosis, which during infancy was not always diagnosed.

The opinion entertained by many that infants under one or two years of age when infected by tuberculosis did not survive the disease was not supported by their investigation. They had among these children many who were infected during the first few months of their existence, and they survived, and even presented a healthy appearance.

Massive infections, such as were found among these children were the strongest factors in the propagation of the disease. Prophylactic measures taken against the spread of tuberculosis, to be effective,

must be directed with a view to the protection of infants and children against massive infections such as had been found among the families that they had investigated.

DISCUSSION.

Dr. T. PASSMORE BERENS said that the readers of the papers had done a valuable service in bringing this subject to the attention of the profession; the work done by the Department of Health for the benefit of the school children of this city is work that is deserving of praise, encouragement and cooperation on the part of the profession at large. It is astonishing to learn from Dr. Cocks' statistics of the large percentage of children who have been operated upon without the use of a general anesthetic. I consider that the practice of operating upon children for the removal of tonsils and adenoids without the use of an anesthetic is most reprehensible and that it should be severely condemned at every opportunity. The practice is a horrible one—it is brutal and unsurgical and the results usually are bad. The nervous shock to the child very frequently causes grave sequellæ—for instance, chorea, postoperative neurasthenia, and last, but not by any means least, a dread of the doctor. It is astounding to think that children are operated upon for the removal of adenoids and tonsils with or without the use of a general anesthetic and then within a few hours are allowed to return to their homes in the care of an untrained attendant. They should not be subjected to the dangers which this pernicious practice entails.

Dr. S. JOSEPHINE BAKER said that she had not been present during the reading of the papers, but she had a general idea of the contents of Dr. Cocks' paper as she was familiar with his work. She wished to endorse his conclusions in regard to tonsil and adenoid operations without anesthetic. It had been their experience that the children did suffer extremely from the severe nervous shock and that from a surgical point of view the operations performed without an anesthetic were not successful. Often children were referred for operation who had already been operated upon but were not improved by the first operation. The hospitals were not equal to the demands made upon them. Last year there were 30,000 children in the public schools requiring adenoid and tonsil operations and less than 20 per cent. were operated upon. The Department of Health accepted the certificate of any physician in regard to the treatment of enlarged tonsils. The Department of Health conducted five hospitals for the performance of adenoid and tonsil operations. These had been in operation for about eighteen months and about 4000 children had been operated upon in these hospitals. There had been one fatality. The children were kept in the hospital thirty-six hours from the time of entrance and at least twenty-four hours after operation. Aside from the one fatality they had had no bad or unfavorable results. It was customary in some dispensaries to send the children home immediately after the operation in the care of an untrained attendant and there were frequently severe secondary

hemorrhages and in one instance which had come to their notice the operation was followed by septic sore throat and death. Dr. Baker expressed the hope that Dr. Cocks' paper would awaken his hearers to the fact that the dispensary was not the place for these operations. It was also to be hoped that the hospital service could be so extended that patients unable to pay could be cared for.

DR. ALFRED F. HESS said that Dr. Fishberg's investigation was of great interest to the community as it concerned perhaps thirty to forty thousand of its children. It seemed that there were three main points raised by this paper: (1) that this group of children were under weight; (2) that they do not gain normally in weight, and (3) that they react in large ratio to tuberculin.

In regard to the question of weight he would like to ask what standard was selected as normal. Were the weights of the children of this group compared with those of similar children or with the weights of normal children living under proper hygienic conditions? If they were compared with children of the latter class, we would expect the weight to be low; while if the comparison was made with children living in tenement houses, there probably would not be so great a difference. Now, if these children are really under weight, what is the cause of it? Is it due to their hereditary constitutional weakness, or to their latent tuberculous disease, or to their poor food and unhygienic surroundings? This of course is important to consider if we wish to strike at the root of the question and attempt a solution. It may be that these children are below par merely because they do not have an average amount of proper food and do not live in quarters of average healthfulness. For it is known that the tuberculous earn less than average wages and therefore live under the poorest general conditions of any of the poor in New York City.

Second, as to the tuberculin test: Dr. Fishberg has shown that the majority of these children react to tuberculin. In fact, we see from the chart that 67 per cent. react in the second year. This in itself must lead to the inference that this reaction does not denote tuberculous disease and that we cannot infer from it that the children will die of tuberculosis. Indeed, the question has been and may be well raised as to whether this reaction does not confer immunity in later life. In this connection Dr. Hess gave as his experience that a small proportion of these reacting children develop tuberculous meningitis.

Third, in regard to the lack of gain of weight: At the Tuberculosis Preventorium in the course of the past five years about 1000 children have been admitted and harbored for a period of about three months. There has been no difficulty in making these children gain, although they are almost all children of tuberculous parents. About 110 out of 900 gained 10 pounds or over; some gained 10 to 20 pounds; one gained 28 pounds. There has been no greater difficulty in making these children gain than in effecting a gain in the ordinary child; so that in this regard Dr. Hess said he cannot agree with the speaker of the evening.

DR. GODFREY R. PISEK said that they should keep in mind the fact that while Dr. Fishberg had done a large and commendable

work it was after all among a special group of people. They were dependants, they were of one race and lived in the tenements. These factors had to be taken into consideration when studying the statistics. It was to be regretted that such work had not been done in other localities as had been done by the essayist for they were certainly in need of just such statistics. He wished that Dr. Fishberg had told them more of his ideas regarding the mode of infection. The reader stated that the majority of the children were breast fed and that during the first year they resisted infection, while during the second and third year the number of infections mounted up rapidly. Was the infection enterogenous or aerogenous? It should also be borne in mind that in these families when the father became the victim of tuberculosis the mother became necessarily the bread winner and the children were left in the father's care at home and were thus in close contact with the source of infection. In this respect the children of this group differed from the general type of child. The percentage of infections in Germany was given as 80 per cent. of those exposed; he had always believed that this percentage and those from European countries was greater than ours and was glad to learn the statistics. Dr. Fishberg had not said much about the physical signs; it would be interesting to know what type of physical signs these children mainly presented. Such physical examinations would be hoped to be made and a report presented. The theory was confirmed that adult tuberculosis was latent tuberculosis in the child, and while they did not see the signs in the prenatal state and during infancy they saw them in what might be termed the paratuberculous conditions of later life. A lowered resistance predisposed to these paratuberculous conditions and was certainly the result of living in a tuberculous environment.

DR. R. OTTOLENGUI said that he was a dentist practising more particularly orthodonty, and hardly felt that he fitted into the discussion but he had been asked to discuss Dr. Cocks' paper. He thought that perhaps he was to tell them that many of the claims of the orthodontist were exaggerated. He was interested in the care of the child in the public schools and was glad to hear of the medical work being done in the schools. If it was true that the Department of Health was finding that the results of tonsil operations were not always satisfactory, it was equally true that the orthodontist was observing the same thing. The time was when the orthodontist would ask the parent if the child had been examined as to the presence of adenoids, but now he asked whether the child had had his adenoids removed, and the answer frequently was "Yes, two or three times." Dr. Cocks had mentioned mouth breathing and the high vault as though they were stigmata of disease. What did the "high vault" mean? Did it mean a vault high from the floor of the mouth, or one high in proportion to the width of the arch? They might have a really high vault or one that only seemed so because of the narrow arch. The statement was made by some dentists that they lowered the vault by pulling the vomer down. There was not a scintilla of truth in this statement; the dentist's intentions were

good but he was mistaken. There was nothing in the apparatus used that could lower the vault, and if there were it would be resisted by the vomer. Another claim was sometimes made that more breathing space could be given by opening the median suture. He had led his profession astray on this point a few years ago but had seen his mistake and acknowledged it. Often the suture between the premaxillary bones was open before they started to perform an operation. There was no evidence to show that the median suture opened. The suture was not one of one bone on another, but an absolutely symmetrical suture with the outer plates of the vomer attached for nearly its entire length. Separating the suture would break the bones and the attached vomer.

DR. JOHN E. MACKENTY did not know that conditions were as bad as had been stated in tonsil cases, but he had noticed that there were many cases which had to be operated on a second time. Children should be examined for nasal obstruction and should be sent to such hospitals as were properly equipped not only to perform the tonsil operations but to care for nasal abnormalities. In children who had suffered from enlarged tonsils and adenoids for a long period there was apt to be hypertrophy of the inferior turbinates. This had been recognized in the clinics abroad and some operations made it a routine practice to remove a small portion of the inferior tubinated when operating on the tonsils in cases where a permanent enlargement of inferior treatments is found. One cause of mouth breathing and of lack of good results was faulty occlusion. The speaker said he was thoroughly in accord with the work of the orthodontists in their endeavor to correct this defect. Again, it often happened that after an operation a child continued to be a mouth breather because he had never been taught to breathe properly; proper breathing will some day be taught in the clinics and the science of breathing will be given a place in our therapeutics. The speaker said that he encountered some bad work sent to his clinic at the Manhattan; in some instances one-half the tonsil remained and the cut surface became cicatricized and obstructed drainage with the result that the condition was worse than before operation. One met with a variety of mutilations as the result of faulty operations. The modern tonsil operation was quite different from the operation formerly done, even by the specialists. The modern operation was a major operation and should be in the hands of an expert.

Where shall the absolutely charity case receive proper and humane treatment? The city hospitals have only forty beds for such cases. The overflow must come to the hospitals maintained by private donations and there receive proper and humane treatment else go to be tortured by a free etherless operation at one of our many dispensaries and immediately be sent home perhaps to bleed to death. Why did not the city pay the expense of a properly done operation at a properly equipped hospital? Was it not too much to expect such hospitals, all facing a yearly deficit, to disburse at least two dollars on each charity case taken care of? The city

should either extend its own facilities or extend financial justice to those who are endeavoring to do this wholly in a human and a proper way.

DR. JOHN WINTERS BRANNAN had been interested in all the papers, but especially in what Dr. Cocks had said in regard to anesthesia in tonsil and adenoid operations. Some six or seven years ago he had seen these operations performed without an anesthetic at Gouverneur Hospital and had been struck by their cruelty, and shortly afterward an order was made by the trustees forbidding these operations without an anesthetic in any of the hospitals of the department. At first all he had thought of was the pain, but, in discussing the subject with laryngologists connected with the special hospitals, he learned that they had taken similar action years before, not simply to save giving pain, but because the operation could not be properly performed without an anesthetic. Last week he had heard that there were still two places in the city where the operation was done without an anesthetic, the one was a dispensary; the other one of the hospitals under his charge where a surgeon was said to have operated three times recently without an anesthetic. On being questioned he replied that he felt justified in his action as he could do the operation in sixteen seconds; all he seemed to think of was speed. A few days later after reflection, he said that he had only removed the adenoids, not the tonsils. The speaker said that he had recently been told that opinion was again changing and that there were now some authorities who believed that the operation could be done without a general anesthetic, so that he was very glad to hear what had been said this evening and hoped that it would stiffen the backs of the trustees of hospitals to insist upon the right course. The organization called the Associated Orthopedic Clinics, composed of representatives of all the out-patient departments and dispensaries in the city, recommended last year that these operations should not be performed in dispensaries, but only in institutions having hospital facilities.

DR. MAURICE FISHBERG, in closing the discussion, said that Dr. Hess had asked a very proper question. One must be careful in making comparisons of this kind—the race factor must always be considered. In his study he had compared the children in the tuberculous milieu with those of the same race stock measured in the public schools in the same neighborhood. To the second question as to whether children who made an active response to the tuberculin test were in danger of their lives, he wished to say that infection may be massive or mild. The child with mild infection may become immune to the disease and not only did not succumb to it but may be proof against reinfection. Those who received a massive infection during the first and second year had probably succumbed and those who survived might carry a latent lesion which may flare up at puberty.

DR. L. E. LA FETRA wished to ask Dr. Cocks one question. When he spoke of operations without a general anesthetic on adenoids and tonsils did he mean that adenoids alone should not be operated

upon without a general anesthetic? He asked this question because there were some cases where an operation for adenoid was required but a tonsil operation was unnecessary.

DR. GERHARD H. COCKS replied that he considered it necessary to use a general anesthetic in the removal of adenoids if one expected to do a complete operation.

TRANSACTIONS OF THE FOURTH ANNUAL MEETING OF THE AMERICAN ASSOCI- ATION FOR STUDY AND PREVEN- TION OF INFANT MORTALITY.

SESSION ON OBSTETRICS.

Washington, D. C., Saturday, November 15, 1913.

The first paper was by DR. HENRY SCHWARZ, Professor of Gynecology and Obstetrics, Washington University, St. Louis.

PRENATAL CARE.*

DISCUSSION.

DR. PHILIP VAN INGEN (New York).—I was particularly interested in the statement that was made in regard to the women in the poor quarters of our city being turned over to male and female obstetricians, putting midwives and a certain portion of the medical profession working in such districts in the same class. That's what we must bear in mind when we consider the midwife problem; that they are not much more poorly qualified to take care of obstetrical cases than some of the doctors practising in the poor parts of the city.

The statement that 90 per cent. of our American women are absolutely without prenatal care is of great importance. That makes America almost the only country which does not provide care for the expectant mother. When I was in London at the recent Conference on Infant Mortality, it was the subject of much discussion that the one part of our problem which has received little or no attention is the expectant mother. We are beginning everywhere in this country to organize campaigns for the expectant mother. I don't know enough of what is going on in other cities, except in a general way, to talk about them. I can only tell you what we are doing in New York. The New York Milk Committee has carried on for two years an extensive campaign of prenatal instruction. We have had 2003 mothers in our care. They are visited regularly every ten days to two weeks from the time they are enrolled until the baby is a month old. It makes no difference whether the mother will be confined in the hospital, or by a physician, or midwife

*For original article see page 370.

in her home. Our idea is to see what can be done under existing conditions to improve the chance of that mother and her baby. We have had 2070 babies. Our stillbirth rate during that time has amounted to 24 per thousand. That takes in only the babies born after the sixth month of gestation. Counting all together it is 36 per thousand. Nearly 20 per cent. of our stillbirths have been during the third month of pregnancy. Our rate of stillbirths among our supervised mothers has been 25 per cent. lower than for the Borough of Manhattan during the same period. Of babies who were born alive, there have been 25 per cent. less deaths during the first month than for the same period in the borough as a whole. Of our mothers, 93 per cent. of all those whose babies were living at the end of the first month were nursing them entirely. Only three and a fraction per cent. were being fed artificially. The American-born mother stands next to the Italian in her ability to nurse her baby, as judged by the figures at the end of the first month. The Italian mother is 93.40 per cent., and the American mother is 93.07 per cent.

We realize that what we are doing is open to criticism. We do the best we can to secure for our mothers the best care they can get. If it is best, we urge them to go to the hospital. In the districts where we are working we don't feel from what we have seen, and really we have approached the matter with open minds—we don't feel that we are urging the mother to do anything very much better when we suggest that she substitute local medical attention for the midwife's attention. The Bellevue School of Midwives does a great deal for these mothers. The care that they get and the supervision that is exercised over the midwives is good. I am not one of those who believe that for many years midwife is a desirable institution. But I do believe that for many years to come the midwife is a necessity. I believe that the trained midwife, the one who is taught how to take care of her women, the midwife who is regulated by the authorities and not allowed to interfere, I might say the female obstetrician, is less dangerous than the male obstetrician in our poor quarters.

THE CHAIRMAN.—We are fortunate in now having a Children's Bureau in the Federal Government. The fact that one of the first publications issued by the Bureau is on Prenatal Care is significant of the importance attached to the subject, and is a matter of gratification to this Committee. We are fortunate in having Mrs. Max West of the Children's Bureau with us.

MRS. MAX WEST (Washington, D. C.).—Dr. Schwarz, in his extremely suggestive and comprehensive statement of the subject under discussion, has mentioned certain factors which are working to bring about a betterment of the conditions which he has so graphically described. I have the honor to represent here to-day the youngest and the least-tried of these factors, the Children's Bureau, which is endeavoring to carry forward its work in behalf of the health and welfare of the children of this country by striving to show mothers how to take care of themselves before the babies are born.

The reasons for undertaking this work were not far to seek. The latest report on Mortality Statistics by the Bureau of the Census shows that about 63,000 babies, or enough to make up the entire population of Fort Wayne, for example, died in the registration area of the United States in 1911 before they had lived to be one month of age, and that of this number more than 69 per cent., or enough babies to provide the total population of a city as large as Topeka or Lincoln, died of specifically prenatal causes or injuries or accidents at birth (43,546). These figures, shocking as they are to all thoughtful persons, do not, unhappily, tell the whole story, since only 63 per cent. of the population of the United States is included in the registration area, at present, and it is a perfectly safe assumption that the proportion of infant deaths is not less in the nonregistration area. The causes of death, covered by the figures you have heard, are congenital debility, malformations, premature births, and accidents or injuries at birth. If to these are added the numbers of those who died from certain other assigned causes, which manifestly must have been to some extent operative before birth, such as the various forms of tuberculosis, syphilis, and organic diseases of the heart, for example, and if finally is added the number of stillbirths, which unfortunately rests on nothing better than estimates in the present state of statistical development in this country, but which is believed by experts to be not less than 100,000 for the whole United States, we should have approximately 150,000 deaths of infants under one month, traceable to conditions existing before birth took place. And this does not take account of the enormous but unknown number of miscarriages. What number or proportion of such deaths can be prevented by adequate prenatal care is, of course, impossible to determine, but the experiences of those who are engaged in this work go to show that a very large proportion of these deaths were wholly needless, and could have been prevented by the application of known rules of healthful living. In this conviction the Children's Bureau entered upon the preparation of a set of instructions for the use of women awaiting motherhood, and on the 16th of last August the pamphlet entitled *Prenatal Care* appeared. The method followed in its preparation was first, to read and study the literature of the subject, or such part of it as was available; second, to observe and learn from the practical experience of those who were carrying on such work, as for example, the New York Association for improving the Condition of the Poor, the New York Milk Committee, and the Women's Municipal League in Boston, through its Committee on Infant Social Service, all of whom put every facility for seeing their work at the disposal of the Bureau; and third, by seeking the counsel and advice of specialists in obstetrics. This help was always most cordially given. The members of the medical profession have been generous and unfailing in their cordial assistance, and, without exception, they have accepted our pamphlet as evidence of the earnest desire of the Bureau to cooperate with them at all times, by making the results of their study and experience available to women everywhere.

The pamphlet has been available for free distribution upon request for twelve weeks. The first edition of 7500 was taken up within three weeks and up to the present time we have distributed 20,000 copies, with requests coming in quite steadily at the rate of approximately one hundred per day. The distribution has been guarded with rather unusual care to insure that the pamphlet should reach only those who would make use of it. By far the greater part of the requests have come directly from interested women, from physicians, from nurses and from heads of various organizations and institutions, municipal, social, philanthropic and educational, all of whom are in a position to make a very direct application of the document. The eugenists present will perhaps be interested to hear that a few ministers have asked to have copies of the pamphlet to include one with each certificate of marriage, and that not a few similar requests have come from secretaries of Young Men's Christian Associations in all parts of the country, and Campfire Girls. One of the most encouraging features of the work we are here interested in, it seems to me, is the avidity with which the women are seizing upon this means of education and instruction. The correspondence of the Bureau affords abundant, often pathetic, evidence of the eagerness of all women to inform themselves upon these vital matters, coming as the letters do, not only from every part of the United States, but from Cuba, Porto Rico, the Philippines, Canada and many foreign countries, but also, and much more significantly, from women of every class of wealth, social standing and education, all alike eager for the help they hope thus to get.

The pamphlet on Prenatal Care, which is the first in our Care of Children Series, attempts to set forth as simply as possible the hygienic rules of pregnancy, and includes a brief chapter on the Nursing Mother. It endeavors, first of all, to be reassuring, showing that motherhood is a perfectly normal experience and that suitable and sufficient prenatal care involves no mysterious knowledge hitherto hidden from the eyes of women, but consists chiefly in the resolute application of the plain rules of health. It urges that symptoms of illness should be brought at once to the attention of a physician, pointing out that such attention is of much greater service in preventing serious trouble later than it could be after the fact. In general, it strives to avoid controversial points and to convey well-authenticated information in the most direct way.

They tell a story over at the Department of Agriculture of the Horse book, as the publication is familiarly known. This book has been printed and reprinted in enormous editions until somewhere in the neighborhood, it is said, of a million copies of the book have been distributed free of charge to interested horse owners throughout the country, probably the largest distribution ever given to any one government publication. The bulletin deals with the subject of the diseases of the horse. Let us not presume to belittle the importance of this subject. Since the automobile has shorn him of so much of his popularity, let us give every attention to his diseases, but in passing I merely beg to call attention to the fact that there is another

Government publication, which deals with the subject of the health of human mothers and babies, to be had with the same ease, and equally free of charge.

THE CHAIRMAN.—Reference was made to the very good work done by the Committee on Infant Social Service of the Women's Municipal League of Boston. I wish Mrs. Putnam would tell us about that.

MRS. WM. LOWELL PUTNAM (Boston).—The Committee on Infant Social Service of the Women's Municipal League of Boston has been devoting the greater part of its time during the past year to giving prenatal care, although it has also been trying for the past eighteen months to introduce teaching in the care of babies into the regular curriculum of the grammar school, for girls of the seventh and eighth grades. Some progress has been made in this matter.

In prenatal work the Committee continues to employ but one nurse, as its object is not personally to carry on prenatal care on a large scale, but simply to try experiments with a view to help other agencies to put their results into larger practice. The number of patients cared for is thus smaller than in previous years, because this year for the first time half of the nurse's time throughout the *full* year has been given to building up and supervising the prenatal work of the Instructive District Nursing Association of Boston. This has been made possible because the Boston Lying-in Hospital, whose house patients were taken care of by this Committee, has become convinced of the importance of prenatal care, and has now for nearly two years employed a nurse for this purpose themselves.

The result of the year's work has been very satisfactory and shows on the whole a steady decrease in threatened eclampsia, in premature births and in stillbirths—although the exact figures are liable to slight fluctuations.

In the last annual report of this Committee to the Women's Municipal League of Boston, which is made up on April 15, the following comparative statistics are given.

COMPARATIVE STATISTICS

April 15, 1909–April 15, 1913.

Percentage of cases of threatened eclampsia to total number of patients:

First year.....	10.2 per cent.
Second year.....	4.8 per cent.
Third year.....	1.7 per cent.
Fourth year.....	.0 per cent.

Percentage of stillbirths to total number of babies:

Average for three years.....	2.6 per cent.
Average for fourth year.....	1.7 per cent.

Percentage of premature births to total number of babies:

Average for three years.....	1.7 per cent.
Average for fourth year.....	.7 per cent.
Average birth weight for whole period.....	7 pounds 9½ oz.
Average birth weight for fourth year alone..	7 pounds 12 oz.

Miscarriages:

First year.	2
Second year.	1
Third year.	0
Fourth year.	0

In the statistics for the present annual report ending October 15, there appears a slight variation from those given above. The percentage of threatened eclampsia has this year been 0.9 per cent., a slight increase over the previous report. The stillbirths also have been slightly higher, 1.8 per cent. as against 1.7 per cent. last year. It is of interest to compare this rate with that of the city at large, as shown in the statistics given by Dr. William H. Davis at the meeting of this Association in 1912. He gives the percentage of stillbirths in Boston for the last twenty years as varying between 33.1 and 44.7 per thousand living births, whereas as just stated the rate of this Committee for the past two years has not exceeded 18.6 per thousand. This rate, including as it does accidents during labor, is a striking illustration of the value of prenatal care. According to the statistics of the City of Boston the number of births in the city in 1912 was approximately 19,000, and the percentage of stillbirths in that year was 39.3 per thousand living births. Had our percentage of stillbirths pertained throughout the whole city 393 babies would have been born alive whose lives as it was were extinguished before they saw the light of day.

The premature births have been reduced so that they stand this year at 0.4. The prevention of the birth of children before their time must result in better health and greater vigor and in saving of much needless suffering and expense. One case of eclampsia has developed this year in spite of the care; a postpartum case, in which no premonitory symptoms whatever could be detected.

The Committee has now carried to confinement 1492 cases besides caring for many others through varying periods, and it still believes that the limit of time allowed between visits should never exceed ten days, and that weekly visits are to be preferred, with a test of the blood pressure and the urine made at every visit.

For the first time the Committee has throughout the whole year made a special investigation of the method of feeding and condition of the child at the end of the first month, as this seems one of the best indications of the value of prenatal care. The statistics are as follows:

METHOD OF FEEDING DETERMINED AT END OF FIRST MONTH.

Breast-fed.	86.3 per cent
Bottle-fed.	10.7 per cent
Mixed feeding.	2.8 per cent

CONDITION OF BABIES AT END OF FIRST MONTH.

Method of Feeding.

Known			Unknown
Breast-fed per cent.	Bottle-fed per cent.	Mixed feeding per cent.	
Well.....97.8	Well.....71.5	Well.....100	Well..... 0
Ill..... 2.1	Ill.....28.5	Ill..... 0	Ill..... 0
Dead..... 0	Dead..... 0	Dead..... 0	Dead..... 3.6

These statistics are of peculiar value in showing unqualifiedly the benefit of prenatal care, as the Committee takes no further care either of mother or child after the onset of labor.

The exhibit of the Committee as shown in Washington at the Fifteenth International Congress on Hygiene and Demography has since been traveling throughout the State of Massachusetts together with that of the State Board of Health and the other Massachusetts organizations.

The spread of this work through other agencies in this city—to other cities of the United States—and even to foreign countries has been most encouraging.

The Boston Lying-in Hospital, as already stated, began this work about two years ago, as did also the Boston Board of Health.

In 1911 and 1912 New York, Milwaukee, St. Louis, Baltimore, Chicago, Buffalo, Fall River and other cities instituted care along the lines of the work of this Committee, and the knowledge of the value of care before birth has been spread through the statistics compiled a short time ago by the Federal Children's Bureau. In these it was shown that 42 per cent. of the mortality of the first year of life occurs during the first month. Within the past week a request has come to the Committee from the University of California for schedule cards and general information to help in carrying on the work there. Dr. Slemmons writes that one of his first requests was for a prenatal nurse. In his letter he says, "The value of such work has been clearly demonstrated in the four weeks the nurse has been working. She has brought to our knowledge several cases of albuminuria that otherwise would have escaped detection until convulsions occurred.

From Edinburgh Dr. Ballantyne writes, speaking of an article in the British Medical Journal, "You will notice on page 825 of the No. for Sept. 27, a reference to your prenatal nurse at Boston—you will also notice that I have adopted the idea in a form in our Maternity Hospital here. We have had the internal arrangements for pregnancy cases for twelve years, and the outdoor development begins now."

The knowledge of the importance of prenatal care is rolling up like a snowball, thanks to the enthusiasm of the members of this Association, and the further it rolls the more it enlarges its borders.

Paper by DR. FRANKLIN S. NEWELL, Associate Professor of Obstetrics and Gynecology, Harvard Medical School, Boston.

"THE IDEAL OBSTETRIC OUT-PATIENT CLINIC."*

DISCUSSION.

DR. J. WHITRIDGE WILLIAMS (Baltimore).—I agree with Dr. Newell's conclusions, but think that the work should be organized along somewhat broader lines. It should include consideration of

- (a) The best method of caring for all women who need it.
- (b) The effect upon the community.
- (c) Its bearing upon the education of medical students.
- (d) Its effect upon advancing knowledge.

In large cities the work is too extensive and diffused to be undertaken by one clinic and should be undertaken jointly by the city and the hospitals with the necessary number of substations. All women whose husbands have less than a certain minimum yearly income should be eligible for such care. The very poor should receive it gratis, while a second class should pay a small fee. To prevent abuse, cooperation with social service workers is essential, which might well be combined with the prenatal care. The community would benefit by having fewer invalid women, more well babies and no blind ones. The city would save money for the reason that it would be necessary to support fewer women in hospitals while being treated for avoidable consequences of childbirth. The midwife problem would be eventually solved. The medical student would be trained to become a better and safer physician.

The entire scheme would fail to produce the best results unless its direction were in the hands of broad-minded men, who are interested not only in caring for the women and their babies, but in actually advancing knowledge. One method would merely substantiate male for female midwives, while the other would train a certain number of persons to be scientific obstetricians and productive investigators. This means that men with university ideals must be in charge of the work.

THE CHAIRMAN.—This question is now before you for discussion. I wonder if Dr. Baker has not a word for us.

DR. S. JOSEPHINE BAKER (New York).—My experience with out-patient clinics is limited. I want to endorse any movement which will make for better care of mothers and babies in our large cities. Whether or not our city would take up a question of the magnitude described by the speaker is debatable. There is a tendency in most of our city governments to assume more and more an attitude of so-called "paternalism" in regard to child welfare movements, and it is possible that such a movement as this may come into being. When it does, it will do a great deal to solve our

*For original article see page 256

vexed midwife question and the problem of the poorly trained doctor, which is a very serious one in our large cities, and it will help to solve the problem of the excessive death rate in infants from congenital debility. Unless we can reduce this latter rate we cannot make very much more headway in the reduction of infant mortality, particularly in those places where the decrease has been marked during the past few years.

DR. GAVIN FULTON (Louisville, Ky.).—My experience along these lines has not been very large although I have been interested in the subject for a number of years, but owing to the lack of funds it is only in the last few months that we have been able to make any headway. We have the same difficulties in raising money in Louisville for charitable or welfare purposes that are experienced in other cities. For the last five years we have been anxious to establish an out-patient obstetrical clinic in Louisville in connection with our child welfare work. I think that it is the most important phase of any in reference to this work. For prenatal instruction and proper obstetrical care of mothers certainly lessens the difficulties of the problem of care and feeding during the first and second nutritive periods. Wherever we go we hear protests against the present inefficient obstetrical training of students and the consequent incompetence of the medical profession in general, particularly during the earlier years of practice in this branch of medicine. It is a familiar cry that the doctor is not trained but this cry is not followed by any proposition of practically improving conditions. I hardly think the remedy can lie along the line which I heard suggested at any one of these meetings in another city, which was as follows: To establish a six months' training school for midwives. The product of such a school would hardly be the superior in efficiency to a four-year graduate of a reputable medical college. I think this plan needs no comment. The ultimate hope in my opinion is for those interested to talk less and be more active in their demands and efforts to improve the clinical instruction of the student. Theory supplemented by a few cases seen from the benches cannot produce the foundation of a good obstetrician. It seems to me that if out-patient obstetrical clinics were established in connection with the infant welfare organizations in which the schools were allowed to take their part, at least an attempt would be made in the remedy of these conditions.

As I have stated, about three months ago we made a modest beginning along these lines. We have established in connection with the Babies' Milk Fund Association, an out-patient obstetrical clinic which is held once a week in offices adjoining the Milk Fund. The University of Louisville pays the slight running expenses of this clinic and provides two students constantly in residence who are present at the clinics and at each delivery under the instruction and supervision of a member of the Medical Staff who is a competent obstetrician. The Milk Fund Association furnishes a nurse who does the prenatal teaching in the homes under the instruction of the Medical Director of the Babies' Milk Fund Association. At the end of the

tenth day after the birth of the baby it is enrolled by the Milk Fund association and its care and feeding are supervised by this Association from the very beginning. Thus giving us the opportunity of breast-feeding in many instances where this food would have been denied the infant and of exercising the proper control of the artificial feeding where it is necessary.

In conclusion the establishment of these clinics offers facilities for improving the teaching in the schools and the training of ignorant expectant mothers in preparation for their future offspring. It further means more breast-fed babies and when we have appreciably increased the number of breast-fed babies we have taken a large step in the lessening of infant mortality and have also simplified the argument of how to feed them.

DR. BENNET (Manchester, N. H.).—We have a scheme for eliminating the midwives in the smaller cities. Manchester's industries are largely textile and shoe manufactories. They employ between them about 23,000 operatives. These operatives are largely of foreign extraction—French Canadian, Germans, Greeks, Poles and other nationalities. The wages paid are small, lower in the textile mills than in the shoe factories. There were last year 2149 births in the city. Of these ninety-four were delivered by midwives, of which there are six in our city. Two of those delivered one case each, one delivered five, and the remaining three delivered eleven, twenty-eight and forty-eight respectively. The midwife who delivered the highest number of cases is the only one in whom we are very much interested. Next year she leaves us seeking more lucrative fields. She is going to New York City. The agency that has made her business unprofitable is the District Nursing Association. The percentage of mothers who are unable to afford either a family physician or hospital care is approximately 11 per cent.; of these 6.6 per cent. have been delivered by the Nursing Association and the remainder by midwives. The executive head of the obstetrical department of the District Nursing Association is a physician. Patients are required to pay what they are able. The Metropolitan Life Insurance Co. has cooperated with us, paying for the mothers who are insured in that company in its Industrial Department. In Boston the criticism was made by Mr. Green that in this way we were encouraging industrial insurance among the poor. We think that criticism is not justified. In the first place, in an industrial center installment insurance will prevail, whether there is savings-bank insurance or not. The little work we did will not increase in any way the amount of such industrial insurance. We are simply taking care of those mothers who would otherwise go to the midwives. Obstetrical service is given by the younger men as they come to town. They are looked up and their records gone over and, if favorable, they are requested to donate to the Association their services subject to call for two or three months a year as the case may be. The question was asked in Boston how we were able to secure their services. It is simply a matter of custom. The older men began donating their services at the organization of the Association and as their practice increased they simply

asked the younger men to do their share. Of course, there are many things that an older man can throw to the younger men in return. It also increases a new man's practice, and ultimately it brings him in good standing with the older men and gives him their stamp of approval in the community. The wage that is paid in cities of this class is low. In Manchester the operatives are employed a larger percentage of the year than in any other shoe or textile city in America; this steady employment to some extent removes the problems of poverty that some of the other cities have to deal with.

DR. FRANK W. PINNEO (Newark, N. J.).—I have been greatly interested in Dr. Newell's admirable paper and excellent outline for an obstetrical out-patient clinic. Where a medical school exists as at Boston, to afford resources in workers it is the best plan yet organized. I am from Newark, a city of about 400,000 population which has a reputation to maintain for the extent and organization of its charities, and which knows the obstetrical problem and seeks its solution. Dr. Williams' broad-minded remarks have been very helpful. Dr. Bennett's report of the experience of Manchester is still more applicable to Newark with a similar population. We have no medical college nor medical students, being so near both New York and Philadelphia. But such a plan as Dr. Bennett commends shows how feasible is the handling of the charity obstetrical cases by medical practitioners when properly organized. Dr. Williams' recommendation that public funds are necessary suggests the possibility that our Board of Health might lend aid to a plan which proved wisely philanthropic and efficient. The speaker would be glad to learn of the experiences of any other city which has a free obstetrical out-patient clinic.

DR. HENRY SCHWARZ (St. Louis).—In America we are better off in having started prenatal work sooner than other countries. We are much better off because of our excellent system of nursing and the other branches of social service health work that have developed along with it, and none is spreading much farther or much quicker. So the public at large will be much sooner notified on that matter. But we are worse off on account of the lack of state control than the old country. Much as Dr. Williams admires the work he still insists that it is the work of the community and the state. As to the work they are doing in Manchester, Dr. Bennett describes the Dispensary of the Washington University when he outlines the Manchester plan. We have in our Dispensary the work of the social service department and the work of the prenatal nurse. We have the women visited after delivery by the district nurses who are in part paid by the Metropolitan Insurance Company. The Company pays 50 cents for each visit. We have many patients who are not insured and the district nurse charges the same price, 50 cents, for each visit. The nurses' association is closely allied with the St. Louis Children's Hospital and when the patients are discharged from our clinic, the children are referred to the St. Louis Children's Hospital Dispensary.

DR. S. JOSEPHINE BAKER (New York).—I would like to report the

fact that by resolution of the Board of Health of New York City, after January 1, 1914, no woman who does not already hold a license will be permitted to practice midwifery in the City of New York until she has completed a course in a school of midwifery registered as maintaining the necessary standard.

BRIEF OF CURRENT LITERATURE.

DISEASES OF CHILDREN.

Colloidal Gold Chloride Test on Cerebrospinal Fluid in Congenital Syphilis.—C. G. Grulee and A. M. Moody (*Journ. A. M. A.*, 1913, lxi, 13) describe the technic of Lange's colloidal gold chloride test on the cerebrospinal fluid and record the results obtained by them in nine cases which were clinically congenital syphilis, seven cases of suspected congenital syphilis, and eight nonsyphilitic cases. Many of these cases of congenital syphilis were confirmed by the Wassermann reaction on the cerebrospinal fluid, but in most cases it was impossible to obtain large enough amounts of the cerebrospinal fluid so that a negative Wassermann could be regarded as of no value in excluding syphilis. While from such a small series of cases one cannot show that the gold chloride test gives specific reactions in cases of congenital syphilis, one would seem justified in making the statement that the reaction was very suggestive and might prove to be of much more value in the diagnosis of congenital syphilis than any laboratory reactions previously projected.

Infantile Diarrhea Caused by Fresh Alfalfa Dairy Ration.—S. Blum (*Arch. Pediat.*, 1913, xxx, 534) states that in the spring and summer of 1912 alfalfa in the dairy ration was a prolific factor in the causation of gastroenteritis among infants in California. Cases of infantile diarrhea appeared synchronously with the inception of fresh alfalfa feeding, increased in number as the fresh feed was more generally utilized, diminished in frequency and ceased to occur coincidentally with the diminution of green feed and the return to a dry dairy ration. The cases were distinctive, characterized by foul, mucoid, green, diarrheal stools, anorexia, vomiting, fever and general malaise. Urticaria occurred occasionally. The cases were comparatively mild, all ending in recovery, following reduction (in some cases) or withdrawal of the affected milk. In other instances increase in the baby's milk food was followed. In some cases recovery immediately followed upon changing from fresh alfalfa milk to milk obtained from dry-fed cows. Fresh alfalfa is so laxative as to cause in cows frequent loose, green evacuations. The milk of these cows has a faintly pungent odor and a decidedly weedy flavor (or after-math). Such milk contains a substance (or substances) not destroyed by boiling, and irritant to the intestinal canal of children, in whom it causes characteristic mucoid, green evacuations.

A tolerance may be acquired, and just as the dairyman gradually introduces green feed into the dairy ration in order to avoid "bloat," so the milk of fresh-alfalfa-fed cows if gradually administered to children may be well tolerated. Indeed, not all children are sensitive to the alfalfa irritant. Weaklings often tolerate it, and it may occur that a child on this milk, although having two or three semi-solid, green evacuations daily, still makes consistent gains. This, however, is not the rule; usually in those cases where the milk of alfalfa-fed cows is not well tolerated there will result gastroenteritis with attendant diarrhea and loss in weight. The logical procedure on recognizing the cause of the trouble is to withdraw the irritant—the guilty milk. For the dairyman who desires to feed fresh alfalfa it is indispensable to introduce it gradually into the dairy ration and to maintain with it a mixed ration.

Treatment of Infantile Diarrhea with Bulgarian Bacillus.—The treatment employed by R. O. Clock (*Jour. A. M. A.*, 1913, lxi, 164) consisted of the administration of a pure culture of the true *Bacillus lactis bulgaricus* in tablet form. One or two tablets were usually given every two or three hours; but in severe cases, two or even three hours before and after each feeding, a total in some cases of forty-two tablets in twenty-four hours. Seventy-four babies were continued on breast milk, diluted whole cow's milk, or in twenty-three between fifteen months and two and a half years of age on their mixed dietaries of milk, cereals, soups, etc. The remaining forty-three patients were placed on a starvation diet of barley water for twenty-four to forty-eight hours, after which small quantities of boiled, skimmed or whole milk were usually added to the diet. Twenty-nine of the forty-three patients who were on a starvation diet were given a preliminary dose of castor oil. No cathartic, however, was given to any of the patients who were on a milk diet. The number of stools usually decreased very rapidly, although this did not always follow. In eleven cases the number of stools continued to be excessive even when the color had become normal; but the babies gained in weight nevertheless. The average time required for the stools to become yellow was 3.1 days. Mucus and blood invariably disappeared from the stools on the second day. As a rule, vomiting ceased. The appetite improved, and the fever practically subsided on the second day. The most striking feature in the treatment of these cases was the phenomenal gain in weight. The other forty-three patients—twenty-nine of whom were given a cathartic—were on a starvation diet of barley-water for the first twenty-four or forty-eight hours, after which small amounts of milk or proprietary foods were added. Twenty-five of these forty-three patients made steady gains in weight, and seventeen of them showed initial losses followed by slow but permanent gains in weight, while one patient suffered a progressive loss, and subsequently died without making any gain in weight. The hygienic surroundings of the patients and the degree of intelligence of the mothers had no influence on the results. The cases recorded prove the value and rationale of continuing a milk diet in infantile intestinal conditions. In

severe cases, best results are obtained by administering a large number of the tablets during the first two or three days of the treatment. As many as forty-two bulgara tablets in twenty-four hours have been given to very young babies without untoward effects. In order to secure the best results, in using the implantation treatment, a pure culture of the true *B. lactis bulgaricus* must be employed; otherwise, disappointment will follow.

Does Teething ever Produce Morbid Symptoms?—According to D. J. M. Miller (*Arch. Pediat.*, 1913, xxx, 538) modern scientific methods of investigation have materially lessened the number of morbid symptoms that may be attributed to teething; but it seems impossible to deny that definite deviations from the normal are frequently associated in a direct causal manner with teething. Many of the symptoms frequently ascribed to teething are purely incidental, and may readily be explained in other ways. The symptoms directly associated with dentition are local and reflex, and include local signs in the mouth, disturbances of digestion, fever, perhaps otalgia, but never otitis; certain nervous disturbances, largely dependent upon the mouth-conditions, and, very doubtfully, convulsions, and, finally, eczema. Gum-lancing, when judiciously performed, has a beneficial effect in relieving the symptoms of morbid dentition. The greatest care should always be exercised in excluding all other causes before connecting any symptom or set of symptoms with the cutting of the teeth.

Cutaneous Affections of Childhood.—A. Schalek (*Jour. A. M. A.*, 1913, lxi, 176) states that skin diseases, especially of the acute type, occur proportionately more frequently in children than in adults. Keeping the skin clean and soft is the best prophylaxis against trouble. Quite a number of eruptions are due directly to dirt. On the other hand, the modern tendency to carry the use of water too far also does a great deal of mischief. Only the purest and mildest soaps should be employed for the skin of children, which is very tender and sensitive. There is no call for admixtures of chemicals or drugs in them. The regulation of gastro-intestinal functions is always an important item of our therapeutics. Most of the breast-fed infants affected with eczema suffer from some dietary mistake. No general rules can be laid down for its correction and each individual case needs its own study and consideration. The feeding may be insufficient, excessive or irregular. If insufficient, the fault may be that the mother's milk is lacking in the necessary percentage of proteins and fat. This is especially the case with anemic women, an increase of sugar being present often in the milk to the detriment of the other solid constituents. More often it will be found, however, that the mother's milk is too rich and that the child is fed too often.

The mistake of allowing older children to partake indiscriminately of whatever food is served to adults is commonly made. At times a plain milk diet becomes imperative. Disturbances of the nervous system have more to do with causing skin diseases than is generally appreciated. Rest and sleep are essential for

the cure of acute skin diseases in children. It is a common experience to see children recover in a hospital under the same treatment which, applied by the mother at home, has proved a failure. A feature which distinguishes the cutaneous affections of children is their deviation in symptomatology from that of adults. The lesions differ both in degree and in type. They assume a more acute and inflammatory character. Certain lesions like the erythematous, vesicular, pustular and bullous predominate over the papular, squamous and infiltrated. Furthermore, what would be called atypical in adults is frequently characteristic in children. Lesions of scabies occur not only in the usual locations, as the hands, feet, wrists, etc., but also on the head and the face. The wheals of urticaria, usually blanched in adults at first, from the compression of the capillaries, are often red from the beginning to the end in children. Impetigo assumes a great variety of clinical aspects and may simulate eczema, pemphigus and other affections. The bullous syphiloderm is seen almost exclusively in infants. In regard to the therapeutics of cutaneous affections of childhood two general rules might be laid down: The first is the correction of any causative or aggravating complication. It is better to do too little in the internal administration of drugs than too much. Those used for adults, such as arsenic, mercury, iodids, etc., must be used with great caution, partly on account of their general effects, partly because the child's skin is much more liable to drug dermatitis, which might complicate or disguise the original trouble. An occasional purge with calomel or some other laxative, some iron tonic, and possibly a diuretic is usually all that is necessary. Antipyretics and opiates should be avoided as much as possible. The second general rule applies to the local management. It should be rather conservative than aggressive. The natural tendency of the skin is to recover to a normal condition if given a chance. Protection of the diseased skin is of the utmost importance. This means avoidance of irritations of whatever nature, exposure to air, water, heat or cold, scratching, the action of physiologic and pathologic secretions, from old and dried-up applications, etc. The tender skin of children does not tolerate and does not need any strong and stimulating action.

Blood and Cerebrospinal Fluid in Mumps.—Observations by A. Feiling (*Lancet*, July 13, 1913) on the blood in forty cases of mumps show a slight increase in the total number of leukocytes, and a lymphocytosis which is both relative and absolute. This lymphocytosis is present on the first day of the disease and persists for at least fourteen days. The occurrence of orchitis does not invariably alter the blood picture. The changes in the blood are of distinct diagnostic value in differentiating mumps from other inflammatory swellings of the parotid or submaxillary salivary glands and from cases of lymphadenitis. From a case reported by him and from the accounts of the other quoted cases he concludes that a lymphocytosis of the cerebro-spinal fluid occurs in mumps, when that disease is complicated by meningitis or by lesions affecting the cranial nerves; and that a lymphocytosis has been found in cases of mumps

which have presented no clear clinical symptoms of any organic lesion of the nervous system.

Tuberculosis Acquired Through Ritual Circumcision.—In the case reported by L. E. Holt (*Jour. A. M. A.*, 1913, lxi, 99) a healthy child, born of healthy parents, breast-fed, developed local symptoms of infection within a few days after the operation and these persisted, being followed after a few weeks by symptoms of general infection which continued until death. The lesions found at necropsy point strongly to a spreading of the infection through the lymphatic system beginning from the wound, and afterward to a general blood infection. At death, which occurred when the child was three and one-half months old, practically every organ in the body was involved. Specially worthy of note in the lesions are tuberculous nodules of the iliac artery and of the myocardium, also tuberculides of the skin. The writer gives a brief summary of forty cases found in the literature. Of the forty-one patients, sixteen are known to have died; seven are reported as having partially recovered or being scrofulous; in twelve the final results were not given; and only six are stated in the histories to have recovered. In several instances death has occurred as late as 11 months from tuberculous meningitis. The usual cause of death has been general tuberculosis. In many of the reports several children have been infected by a single operator. As a rule the earliest symptoms of infection have been observed in about a week after the operation. The wound does not heal, but suppuration occurs and ulceration soon follows. The early ulcer may be anywhere on the prepuce but is often on the frenum. It may remain as a localized process or be general. At the end of a second or third week inguinal adenitis develops. In a very considerable number of cases it is reported that the lymph-nodes broke down and abscess formed, usually in two or three months after the initial infection. The cases in which early suppuration of the inguinal lymph-nodes took place and which were operated on, either by removal or curetting, were among those in which the results were the best. The symptoms of a wide-spread general infection rarely occurred earlier than the third or fourth month. In a very large proportion of the cases reported the first diagnosis made was syphilis. The writer believes that syphilis is less frequently acquired in this manner than is tuberculosis and that the latter disease should be first suspected.

Endocarditis in Children.—L. W. Gilbert (*Bost. Med. and Surg. Jour.*, 1913, clxix, 85) says that acute endocarditis should be considered as acute over a much longer period than has been the custom. Treatment should be carried out over months and perhaps years, until all possible signs of acute disease have disappeared, and even then, until adolescence is passed, at least a certain amount of restraint should be exercised.

Fracture of the Carpal Scaphoid in Childhood and Adolescence.—W. P. Cones (*Bost. Med. and Surg. Jour.*, 1913, clxix, 88) speaks of fracture of the carpal scaphoid in childhood or young adolescents as one of the rarest of injuries. The developmental conditions of bone

about the wrist at these ages are probably largely responsible for this. When children receive injuries to the wrist the possibility of this fracture must be thought of. Particularly is this true in cases where there is no tenderness over the lower end of the radius and ulna but pain and tenderness over the dorsum of the hand just distal to the lower end of the radius and in the snuff box. A marked swelling of the dorsum of the hand, stopping abruptly at the radius and ulna, which was present in the writer's case, may be of considerable diagnostic importance. A radiograph should always be taken of these injuries and the scaphoid scanned searchingly for possible fracture.

End Results of Operative Treatment of Spastic Paralysis.—The statement is sometimes made that free division of the tendo-achillis for equinus deformity may be followed by permanent and undesirable lengthening of the tendon in spastic paralysis, as well as in other conditions causing similar deformity. A study was therefore made by H. E. Harris (*Bost. Med. and Surg. Journ.*, 1913, clxix, 82) of fifty-seven cases of spastic paralysis which were operated upon at the Children's Hospital during the five years ending in 1912, and which, with the exception of two cases, had been free from apparatus or treatment of any kind other than exercise and massage for at least the last six months. Of this number twenty-two have been recently seen. Of the cases under consideration one was diagnosed as spastic idiocy, and two showed mentality dull and stupid and refused to talk or answer questions when spoken to. In cases of very deficient mentality, and without the coöperation of the patient in trying to walk, surgical interference with spastic paralysis is likely to be of little use. The only complete failure following the cutting of the ham string and adductors was in the idiot. After reporting in detail the operations and results the writer says that excellent results in these cases have followed subcutaneous tenotomies, whether they were zigzag or otherwise, and this has an important bearing on the question as to whether there is danger of permanent and undesirable lengthening of the tendo-achillis after free division, and such conditions were especially looked for in the twenty-two cases discussed and none were noted. It would seem, therefore, that the open operation is not at all necessary. It also seems that alcoholic injections of the nerves have not in the cases reported prevented the return of spastic contractures. Children who have not taken a step, have been able to walk as a result of simple division or resection of the adductors and ham strings, and apparently much can be expected from the Tubby procedure of transferring the pronator radii teres to work as a supinator. Although the operative procedure may be that properly suited to the individual case, it has also been shown that without careful after-treatment and the long-continued after-use of plaster and apparatus the various operations are likely to be of little use.

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ORIGINAL COMMUNICATIONS

OVARIAN PREGNANCY, WITH REPORT OF A CASE.*

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(With thirteen illustrations.)

Up to a few years ago the best authorities on ectopic pregnancy refused to recognize the possibility of ovarian gestation, and the cases reported as such were not sufficient to really warrant their acceptance. Tait, Sutton, and Webster emphatically denied the fertilization and implantation of the ovum in the ovary. The last author based his opinion on two points.

First, the insufficient evidence in the cases described.

Second, the assumption founded on his theory of the decidual reaction that the implantation and development of the human ovum is possible only in tissue derived from the Müllerian tract, and consequent inability of the ovary to develop such specific reaction. (Webster, *Ectopic Pregnancy*, Edinburgh and London, 1895.) Kower (1893) presented before a gynecological society a specimen of ovarian pregnancy, a summarized pathological report of which was later published by Dr. Catherine Van Tussenbrock (*Centralblatt für Gyn.*, 1897). This in fact is the first positive case on record, and was later (1899) thoroughly described and carefully studied anatomically by Dr. Van Tussenbrock. The complete description in detail of the Van Tussenbrock specimen, besides proving beyond doubt the

* Read before the Gynecological Section, New York Academy of Medicine, December 23, 1913, Histological Work from the Pathological Department of Cornell University.

real condition, and disproving the statement of Webster, served as a guide for further observations. For a long time convincing data had been demanded as evidence of primary ovarian gestation, but the opinions of observers differed as to the necessary requirements.

Spiegelberg as far back as 1878 was the first to suggest certain factors of identification, viz.:

- (a) Integrity of the tube on the affected side.
- (b) Fetal sac in the position of the ovary.
- (c) Connection of the sac with the uterus by the ovarian ligament.
- (d) Ovarian tissue distinctly demonstrated in the sac wall.



FIG. 1.—A. Distal pole of left ovary, site of rupture. B, Fimbriated extremity free from adhesions, open.

These requirements were later considered insufficient. Heineken insisted on the presence of the placenta inside the ovarian tissue. Williams added to the demands of Spiegelberg that ovarian tissue should be found in several distant parts of the sac. Werth requires the corresponding tube to be absolutely intact and independent from the gestation sac. Norris making more complete this last requirement, demands that the tube on the affected side should be microscopically negative of evidence of pregnancy. Upon this basis the most complete and careful study of the specimen should decide as to the condition. But if we consider the different opinions as to these criteria, the difficulty in having them all supported by the actual find-

ings, and the rare presence of all of them in the same case, we will easily understand how seldom the diagnosis can be satisfactorily established. All the requirements, however, seem to be lacking in something. That of Norris, for instance, which stands as the most complete, is still open to certain criticism. Can he doubt the primary development of the gestation in the ovary, because of finding of a decidual reaction in the corresponding tube? If with a tubal pregnancy the opposite tube is apt to react, why cannot we obtain the same reaction in the tube connected with the pregnant ovary? In



FIG. 2.—The inner aspect of the resected ovary from which sections were made.

his case of combined ovarian and uterine pregnancy he found decidual reaction in the proximal third of the tube and quite correctly ascribed it to the actual uterine pregnancy. However, at present the material at hand is so scant as to make premature and hazardous any conclusion. As to anatomical relations of tube and ovary, how can we recognize them, when the gestation sac is too far advanced, has flattened out all the surrounding tissues, and has formed adhesions, reducing to a shapeless mass tubal and ovarian structures? How can we establish anatomical relations when the operation is performed

several days after the occurrence of the rupture? Webster has reviewed the many instances in which a mistake is possible, viz.:

(a) Hematoma ovarii.

(b) Pregnancy in an accessory tube in which case the sac becomes closely adherent to the ovary, and the normal tube is found free from the gestation sac.

(c) Pregnancy in an accessory fimbriated extremity, in a diverticu-

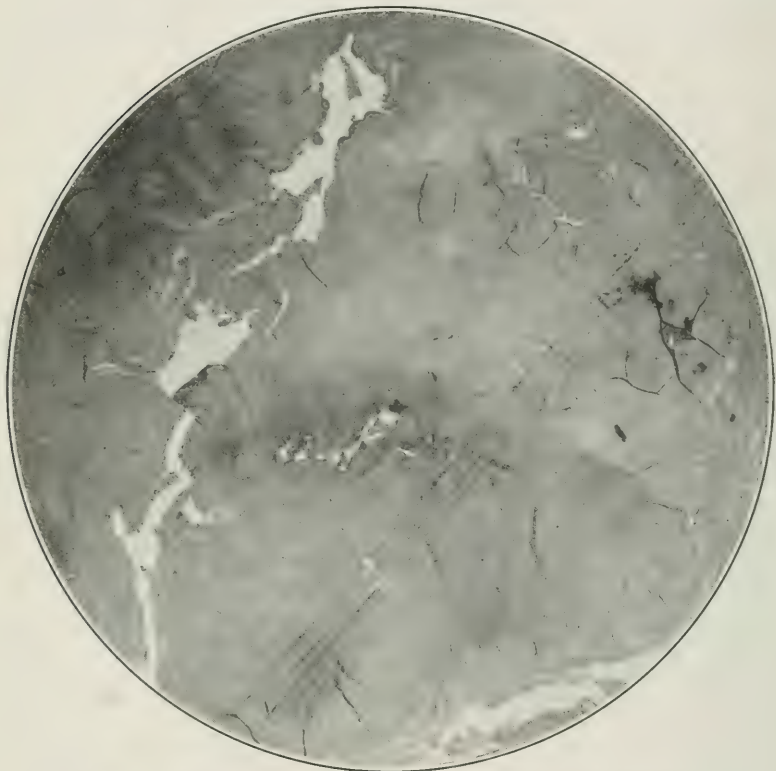


FIG. 3.—Section showing corpus luteum and ovarian stroma.

lum of the tube, or on the ovarian fimbriæ in which the ovary may become such an intimate part of the sac as to be mistaken for the primary seat of implantation of the ovum.

(d) Pregnancy in the fimbriated extremity of the tube, the fimbriated extremity being in this case adherent to the sac.

(e) Intraligamentous (and to this I would add abdominal pregnancy) secondary to tubal abortion or rupture with consecutive intimate adherence to the ovary, as in a case carefully studied in

which Webster could trace the site of the rupture in the greatly distended tube which was adherent to the sac, but apparently independent of it.

All these possible causes of error are more apt to occur, the more advanced the pregnancy. No doubt in the earlier cases the task is comparatively easy. The anatomical relations are less altered and the microscopical findings show such intimate connection of fetal

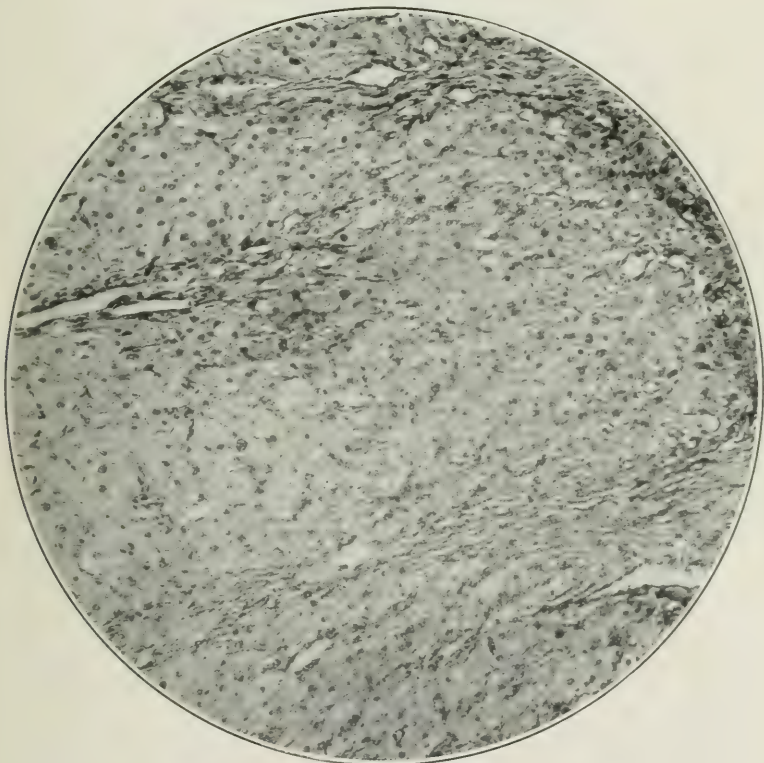


FIG. 4.—Corpus luteum.

and ovarian tissues, that there is hardly any doubt as to the origin of the pregnancy.

One factor of great importance in ascertaining the ovarian origin is found in the statement of Van Tussenbroek, that ovarian pregnancy means pregnancy in an ovarian follicle. This statement holds good, sustained as it is, by the evidence found in the statistics. Eleven out of nineteen cases reported by Norris showed evidence of

corpus luteum in different stages of evolution, connected more or less closely to the gestation sac.

The situation of placental tissue deep down in the follicle and consequently enclosed and surrounded by ovarian tissue, cannot be considered as a secondary invasion of the ovary or possibly be mistaken for a simple adhesion of tissue.

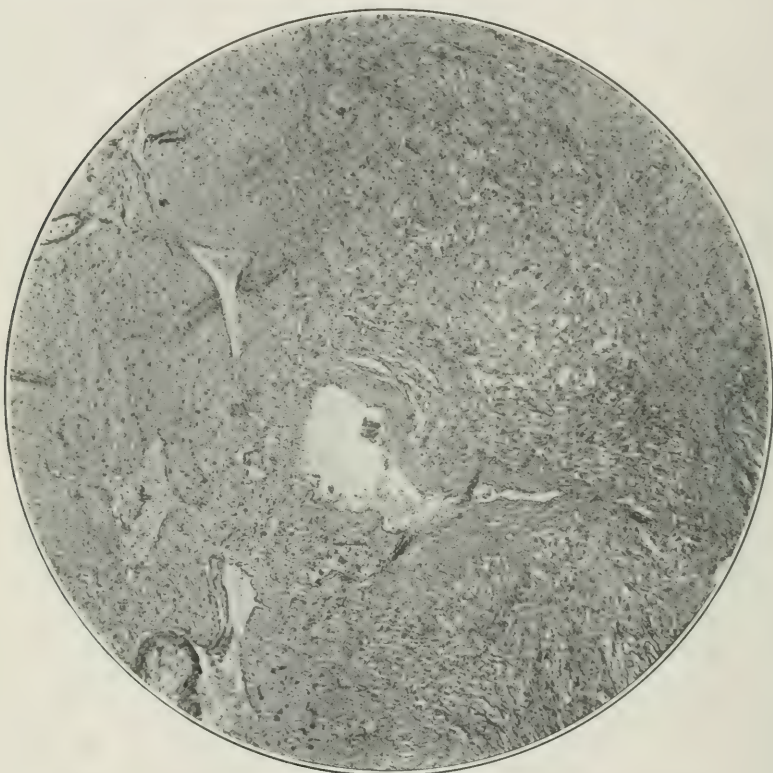


FIG. 5.—Relation of fetal tissue with column of corpus luteum.

The exclusion of any evidence of pregnancy in the corresponding tube (fetal elements) is a strong point in favor of the ovarian origin. Decidual reaction is perfectly possible and could not be considered as strong negative evidence against the diagnosis of ovarian pregnancy.

We must conclude that in early cases, the diagnosis of primary ovarian pregnancy is relatively easy after a careful combined microscopical study of the specimen.

On account of the great difficulty of determining the real nature of the cases Williams divides them into positive, highly probable, prob-

able and doubtful. Up to 1906 he was able to find only thirteen cases which belonged to the first class, and seventeen to the second.

Norris in 1909 reported nineteen cases. Then follow the reports of Bryce, A. W. W. Lea, Rubin, Graham (1912), and McCann (1913), each having had one case.

Etiology.—The rare occurrence of the condition makes the real causes of ovarian pregnancy rather obscure, more so on account of

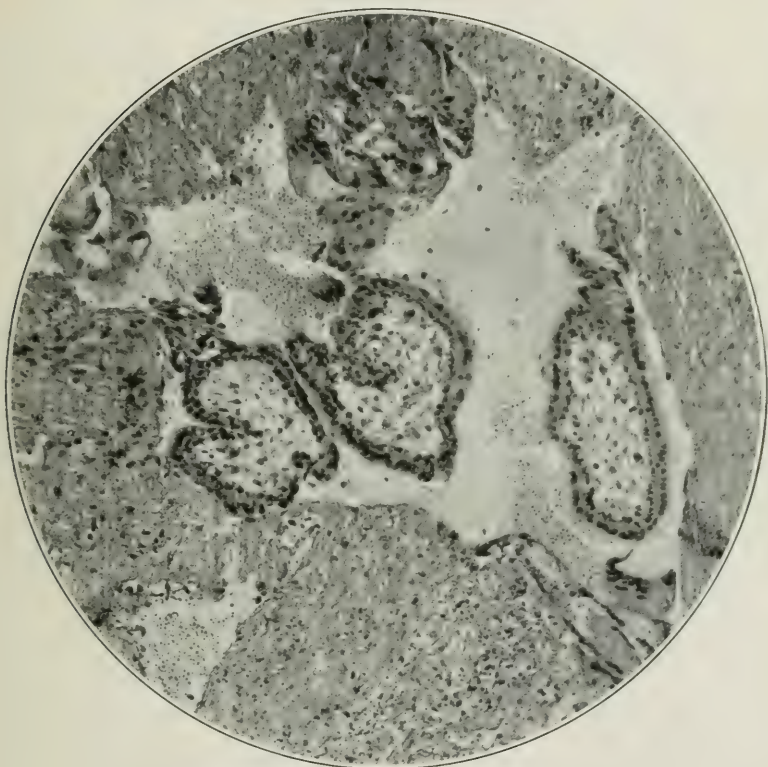


FIG. 6.—Villi showing distinctly both epithelial strata.

the unsettled opinion as to the determining causes of ectopic pregnancy in general. But obscure as it is, the etiology is always the most interesting question connected with the study of this subject.

Those ingenious hypotheses which Webster presented as a foundation, in accounting for tubal pregnancies, did not extend to the explanation of those ectopics occurring outside the tube.

He insisted on the decidual reaction as an indispensable factor

to the implantation of the ovum, and believed this reaction to be specific to Müllerian tissue only.

In the human female, under normal conditions, only the uterus is able to respond to the genetic influence. The tube occasionally reacts as a result of some developmental fault, or as a structural or functional reversion of the tubal mucosa to an earlier type in mammalian evolution.



FIG. 7.—Chorionic villi completely surrounded by columns of lutein cells.

When these conditions exist, several contributory causes (site of fertilization above or below the point of occurrence of the decidual reaction in the tube, inflammatory processes, distortions, tumors in the tube) will determine whether a fertilized ovum shall develop in the tube or in the uterus.

As a logical consequence of these views, Webster, at the time of the publication of his theory, refused to accept the possibility of ovarian pregnancy with the statement that there can be no pregnancy where

no genetic reaction is possible. There is no reason to believe that the Graafian follicle can respond to the genetic influence, and there is no proof that any pregnancy ever started in them.

Now, without going into all the details, and successive studies of the formation of the decidua in the uterus and tubes, I will confine myself to the statement that it is the general consensus of opinion



FIG. 8.—Chorionic cells pushing and breaking a blood-vessel in the ovarian stroma.

that decidual reaction in the human female is only specific to the uterus in consequence of the functional requirement and occasionally occurs in the tube, but is never as complete as in the uterus. There is no reason to believe that this reaction is a primary cause of ectopic in the tube, but it is more logical to regard it as a result of the specific action of the fertilized ovum in a tissue homologous or phylogenetically analogous to the submucous layer of the uterus. We should also remember that ectopic pregnancy is a pathological condition, and

as such, only pathological factors are worthy of consideration as etiological.

Reversion of function is only a vague theoretical point, when it has no anatomical ground as a foundation. Due importance must be given as efficient causes to all the conditions considered by Webster as only contributory. In considering now the data acquired through a careful study of the reported cases of ovarian pregnancy, we feel

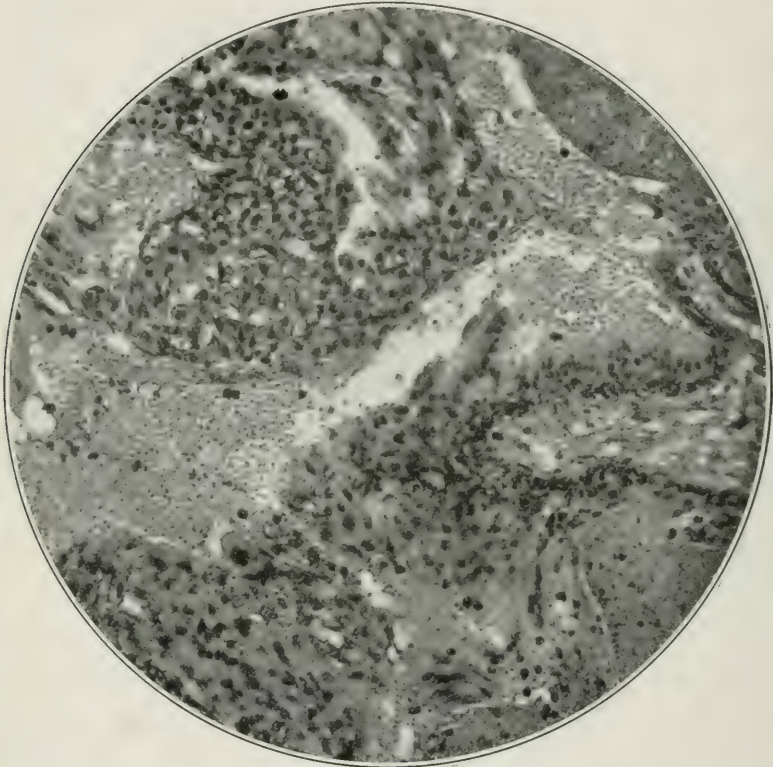


FIG. 9.—Villi and proliferating epithelial layer.

inclined to state that the definite acceptance of them is a strong argument against Webster's theory.

When Webster himself published his first case he was forced to recognize the occurrence of ovarian pregnancy, but to support his theory he ascribed the condition to the inclusion of Müllerian tissue in the ovary.

The researches of Williams and the positive findings of columnar epithelial structures in the ovary could not be considered sufficient

ground for this contention. Presence of Müllerian tissue in close relation to the fetal structures should be essential to maintain this claim.

In none of the reported cases of ovarian pregnancy, however, has such occurrence been verified, and in the only instance, recently reported by Graham, in which a tubule with epithelium and muscular tissue was present, the structure was quite distant from the site of

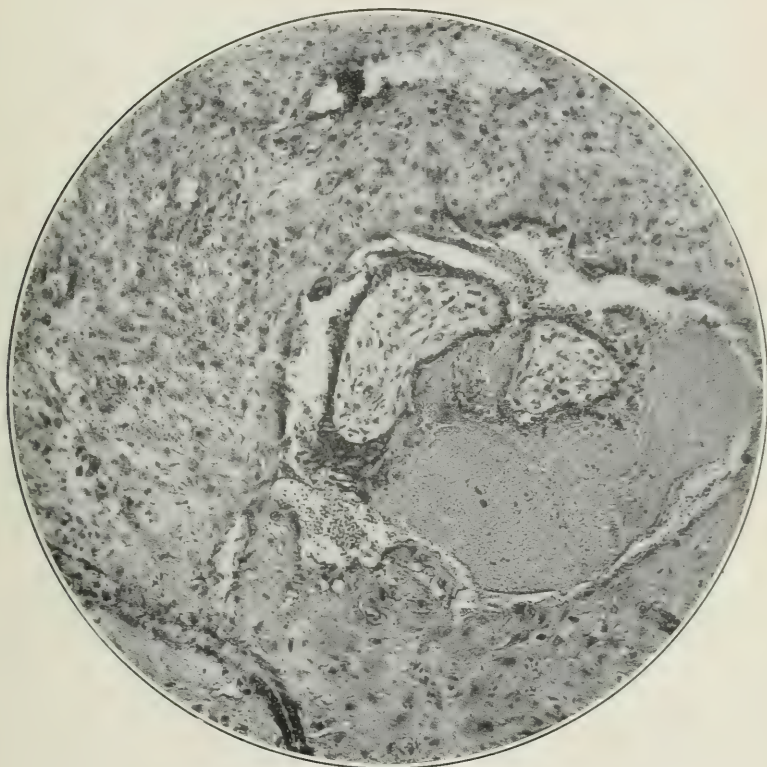


FIG. 10.—Villi in a large sinus.

the ovum, and did not show any changes indicating previous relation with the ovum. This is in opposition to the contention of Graham, that the ovum was primarily implanted in that tubule, and secondarily was attracted toward the corpus luteum.

Besides the presence of decidual changes found by Walker, Dobbert, Schwartz and others in the pouch of Douglas, and at many other points in the subserous tissue surrounding the uterus, and also in other structures as vagina, parovarian cysts and omentum and

appendix (in this last structure quite recently by G. Outerbridge), could not easily be explained with the same inclusion theory. On the other hand no decidual reaction of any considerable extent has been found in the pregnant ovary, except a slight one recorded by Webster in one case and Rubin in another. The second complete report of Van Tussenbrock rejects the acknowledged decidual reaction



FIG. 11.—Chorionic cells free in a large sinus.

of the first report and after most careful differential analysis she recognized the lutein nature of the cells.

The necrotic changes incident to the tissue surrounding the ovum and the difficulty of differentiating the two varieties of cells was responsible for the confusion.

Bryce and Teacher acknowledged the presence of decidua-like cells in the ovarian stroma in their specimen.

In my first report, which accompanied the presentation of my speci-

men to the Pathological Society, I spoke of a slight decidual reaction in my specimen.

After the most careful study of various sections with the assistance of Dr. Ewing, I found what I would call an attempt of decidual formation. Here and there, scattered groups of cells of decidua-like nature were found, especially around blood-vessels. In no part of the fibrillar connective tissue covering the columns of lutein cells



FIG. 12.—Layer of decidua-like cells in the boundary of ovarian stroma and fibrin enclosing fetal structures.

or the fibrous septa of the same columns, considered by Tussenbrock as the tissue only possible to react, was there any evidence of decidual cells.

Tussenbrock claims that the absence of decidual reaction in the ovary would easily explain, from the lack of the necessary trophic properties of the decidua, the hemorrhages between ovular sac and maternal tissue. If we consider the decidua as a barrier to the inva-

sion of the fetal tissue, we can easily explain from its insufficient formation the considerable invasion of villi and chorionic cells in the ovarian stroma and in parts quite distant from the fetal tissue.

These pathological facts stand against the statement that many cases considered as ovarian went to term, probably on account of the greater accommodation of the ovarian tissue.

Ovarian pregnancy, until it was clearly demonstrated, was con-

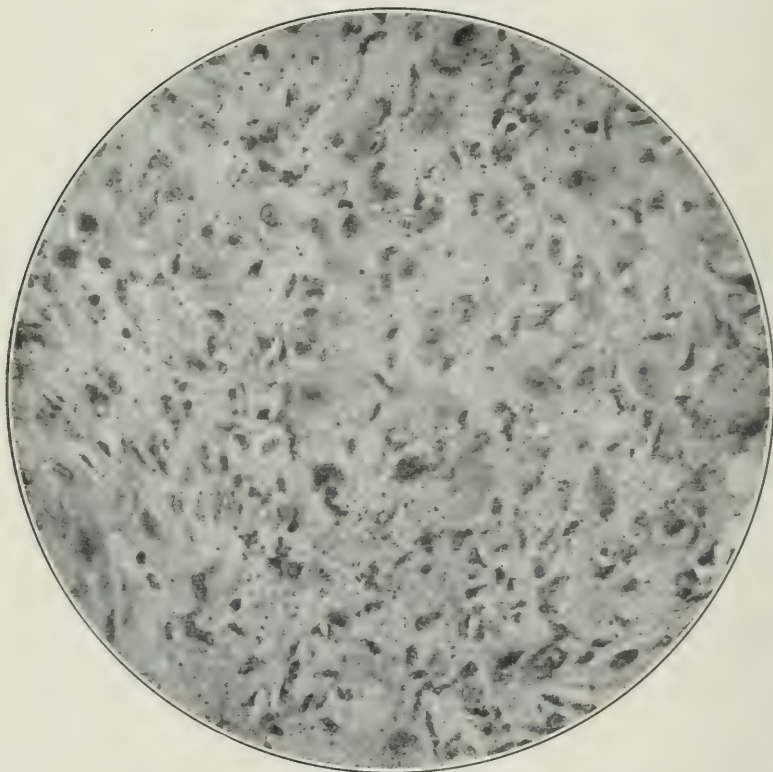


FIG. 13.—Decidua-like cells sparsely grouped in the ovarian stroma.

sidered impossible, as the ovary could hardly be thought of as a possible meeting place for the spermatozoon and ovum. Stratz observed in the *Sorex* the penetration of the spermatozoon in the follicle between the cells of the granulosa. In the human female this is hardly possible of demonstration. But, if we have to reason by analogy, and on the other hand if we have to accept as primary, the implantation of the ovum in the ovary, we cannot but admit that the

fertilization was also ovarian. Eleven cases out of nineteen reported by Norris showed a close relation of the ovum with a corpus luteum.

Leopold admits that the ovum from a follicle deeply situated passes into a superficial one, in which it becomes fecundated by a spermatozoon which had penetrated there.

This hypothesis has had no actual proof. Clinical data, supported by anatomical findings, and the opinions of the majority of authors tend to attribute great importance to inflammatory processes of the tubes as etiological factors of tubal gestation.

Inflammations of the ovary, and especially periovaritis are most probable causes of ovarian pregnancy. The resistance of such ovarian tissue to rupture by the ripening follicles and the subsequent formation of cystic conditions is familiar to us all. It is quite possible that the opening in the mature follicle may be insufficient to allow the exit of the ovum, or incidental disease of the granulosa or of the theca folliculi render impossible the escape of the ovum.

In my case the patient had been infected with gonorrhea. As a result she had a tubal ectopic on the right side two years previous to this ectopic, which occurred in the left. Evidence of inflammatory processes are clearly shown in tube and ovary.

As to symptomatology and clinical diagnosis the condition does not offer any special interest, in no way differing from tubal ectopic. A brief history of the case follows herewith.

M. C., thirty-three years old, Italian. Menstruated at fourteen years, regular. Married twelve years, three children. The last five years ago. Five miscarriages; the last one four years ago. Infected with syphilis and gonorrhea. Acute attack of gonorrhea fifteen months before first ectopic. In June, 1909, I operated on her for ectopic in the right tube. Tube and ovary of right side were removed.

In January, 1912, she missed her period for a few days. On the 10th of January she had a severe attack of pain all over the abdomen accompanied by scanty flow. In the next fifteen days she had two or three more successive attacks with collapse. Was treated at home with ice-bag on the abdomen until the real condition was diagnosed. When I saw her on January 24, I noted abdomen moderately distended and tender. Left side of pelvis tender and rigid; no distinct mass could be detected by abdominal examination. Vaginal examination showed uterus in good position. A distinct mass on the left side. Posterior culdesac tender and little distended. No evident passage of membranes had occurred. Slight dark bloody discharge.

At the operation, fifteen days after initial attack, the abdomen was moderately filled with free and clotted blood. Clots around left adnexa, but no formation of a distinct hematocele. Fimbriated

end of tube open. No trace of rupture in the tube. The ovary on the distal pole was apparently damaged and covered by clotted blood. The case was considered at the time as one of tubal abortion. The tube was removed and with it almost a third of left ovary was resected on the distal pole. This resection was necessary on account of the absence of the right ovary, removed at the previous operation. The condition of the ovary was interpreted as one of hematoma from rupture at the site of the follicle. The real nature of the specimen was not found until microscopical examination was made.

Gross Specimen.—It is made up of the left tube and part of the left ovary still attached to the tube by a slight band of tissue. The tube, about 7 cm. long, was cut very close into the uterine horn. No marked enlargement at any point. The ampulla was thickened and hard. No kinks, no traces of rupture.

The fimbriated extremity was free from adhesions, but traces of blood were found adherent to some fimbriae and external surface of the tube.

A section 7 mm. thick comprising part of the ampulla was cut out for microscopical research, leaving the fimbriated extremity detached.

The resected ovary was reduced in the specimen to an oval flat section measuring 2 by 3 cm. in diameter and about 5 mm. thick, representing the distal pole of left ovary still connected to the tube by a slight band of tissue. The outside surface apparently rough, shows a central dark area surrounded by a thin layer of grayish tissue. All this surface represents the site of the rupture.

The photograph is not complete on account of the pieces cut out for the microscopical sections.

The contrast between the central and the peripheral area is most marked on the inner surface.

A portion of tissue, 7 mm. thick, was cut from the middle of the specimen of the resected ovary, leaving the inner end which macroscopically shows the structure of a corpus luteum.

From this ovarian section, from the section taken from the tube, and from the corpus luteum many slides were made for microscopical study.

In comparing the gross appearance with the microscopical findings the embedding of the ovum seems to have been deeply situated about 1.5 cm. in the ovarian substance.

Microscopical Findings.—The tissue was fixed in 10 per cent. formalin and embedded in paraffin. The sections were stained with hematoxylin-eosin. One microphotograph (magnified 20) was taken of one entire section, comprising almost all the area of tissue. In this microphotograph we can easily distinguish a peripheral layer of tissue more or less loosely connected with the central area of tissue which is broken up in many points.

In one segment of the peripheral layer, the characteristics of the corpus luteum are clearly apparent from the inner aspect and almost intimately connected with the same is a triangular-

shaped section of tissue. This section assumes well the hematoxylin stain and from the details to be later described could possibly be considered the placental implantation.

Going now into the microscopical details, we find the surrounding ovarian stroma reduced to a thin shell, except where the corpus luteum is situated.

In none of the sections could I find any trace of germinal epithelium, no follicles in any stage of evolution, and no corpora albicantia or cysts. The ovarian stroma was apparently normal. No evidence of recent or past inflammatory processes. What is most striking is the abundance of blood-vessels in this cortical layer. Large veins are filled with blood. In the parts in which the corpus luteum is absent the ovarian stroma is exceedingly thin and loose. The tissue seems to be thinned out by the eccentric pressure of the extravasated blood, but due consideration must be given to the active invasion of fetal elements. In these parts of the stroma in fact, and not in any of the parts externally contiguous to the corpus luteum, the invasion of villi and chorionic elements is considerable. Large veins contain villi and chorionic elements free in the lumen, and in some sections we can easily follow the process of the fetal elements pushing and breaking through the walls of blood-vessels to penetrate them.

A part from this external layer and 2 mm. inside the surface lies a well-formed segment of a corpus luteum. It consists of from four to six festoons in the different sections.

In some of the sections the concave side of the corpus luteum faces toward the central area, is intimately connected with the fetal tissue, and its extremities extend directly into the ovarian stroma.

In one section the corpus luteum formation is traversed by fetal tissue invading ovarian stroma.

In another section probably at the extreme end of the fetal implantation, the corpus luteum forms a ring surrounding a cavity filled with fetal elements.

This structure is well developed. It plainly shows the festooned appearance, due to the distribution of the large epithelioid cells, with granular protoplasm, and small round faintly staining nuclei, traversed by fibrous partitions.

These septa are continuous with the connective tissue forming the external theca, and with the thin fibrous layer covering the inner side of the corpus luteum. Many blood-vessels and lymphatics are present in these fibrous partitions. The lutein cells which are almost all normal, seem in the highest stage of evolution, and only few show degenerative changes.

The central area is constituted of blood, fibrin and villi with chorionic cells.

Most of the villi show a normal stroma covered by a double layer of cells, the internal or Langhans and the external of syncytial. Many villi show projecting buds of proliferating cells.

A few chorionic cells are scattered in groups. The study of the relations between fetal and maternal tissue would greatly aid in

throwing some light on the unsettled questions connected with ovarian pregnancy, and indirectly on the whole subject of ectopic gestation.

Decidual formation and embedding of the ovum in the ovary are still unsolved problems, owing to the infrequent occurrence of these cases, and absence of early uninterrupted specimens.

After the most careful study of all the sections I found what I would only call an attempt at decidual formation. Sparsely grouped cells are found along the margin of the ovum, or better in the boundary between fetal structure and ovarian stroma.

The cells are large polygonal, or oval, with one or two round nuclei, they took the stain very lightly and are embedded in a layer of fibrin which lies at the boundary of the two structures. Cells of similar characters are scattered in the ovarian stroma and around blood-vessels.

The fact is worth considering that no similar cells are found in the fibrin and fibrous tissue covering the inner aspect of the corpus luteum, or in the fibrous tissue constituting the septa of the corpus luteum.

This so-called attempt at decidual formation is more marked where the invasion of fetal elements into the ovarian stroma seems most active.

The shape, the size, and the manner of assuming the stain seem to differentiate them from the Langhans and syncytial cells; these last two varieties however seem to proceed into the tissue more closely grouped.

Whether the fibrinous layer surrounding the ovum and containing these cells is the representative of a true decidua is only a matter of conjecture. The alteration in the relations of tissue, due to the rupture, and changes due to delayed operation, is responsible for this unfavorable condition.

The principal features of this attempt at decidual formation, viz.:

- (a) Its occurrence in the stroma of the ovary,
- (b) Its marked appearance where the invasion of chorionic elements is more active,
- (c) Its absence in proximity of the corpus luteum and fibrous constituents, are conditions which demand an explanation.

The first fact would indicate the reaction of a connective tissue to the specific action of the ovum. The connective tissue of the ovary would respond to the specific stimulus (invasive properties of the chorionic elements) with an attempt to resist the invasion. It is only logical to admit that the line of defense should be more marked where the invasion is greater.

The third condition is dependent on the unsettled questions connected with the formation and function of the corpus luteum.

The origin which the most recent investigators ascribe to the lutein

cells from the connective cells of the internal theca, the apparent affinity of the decidual and lutein cells, the function ascribed to the corpus luteum of directing the normal development of the ovum, and controlling the invasive power of the chorionic elements, could possibly explain why the follicle should be considered good ground for the embedding of the ovum, and the synchronous formation of the corpus luteum should offer a relative resistance to the invasion of chorionic elements. In other words, it seems possible for the layer of lutein cells to take the place of the decidua in its functions.

Further, the absence of decidual cells in and about the corpus luteum, and the absence of chorionic cells outside of the corpus luteum, in the corresponding ovarian stroma, would seemingly substantiate such hypothesis.

But we need positive evidence, based on extensive experience, before we may arrive at such a conclusion. I wish here to emphasize the fact of the intimate relation existing between the fetal tissue and the well-formed corpus luteum in my case, considering that only a thin fibrous layer connects the two structures. The most complete evidence of this fact is found in a careful study of the different sections in which it is easy to discern the progressive stages on the relation of the two structures. Some sections show the fetal elements completely enclosed within the corpus luteum, the latter forming a complete ring.

Others show the fetal tissue breaking through the lutein partitions, to pass directly outside into the ovarian stroma.

Still others present the appearance of the ovum almost completely crowding out the corpus luteum with only a small portion of the lutein cells remaining. This evidence seems to be conclusive for the implantation of the ovum directly in the follicle.

Microscopic Findings of Tubal Sections.—The sections taken from the ampullar part of the tube, and stained with hematoxylin-eosin, distinctly show the evidence of inflammatory processes.

The canal is smaller than ordinarily appears in the ampulla.

The wall is considerably thickened. The mucous membrane is not so arborescent as usual. The mucous folds are greatly reduced. The epithelium in some parts is flattened, proliferating and desquamating.

There is a very slight glandular appearance in the mucous folds, none in the stroma. The mucous stroma shows marked round-cell infiltration. This is present between the muscular bundles.

The external layer is considerably thickened, due to extensive proliferation of connective tissue. Edema of subperitoneal layer and considerable round-cell infiltration are present. There is no evidence of fetal elements anywhere in the tube.

CONCLUSIONS.

First, macroscopical and microscopical evidence establish beyond any doubt the primary ovarian nature of the gestation.

Second, the intimate relation of fetal tissue and corpus luteum in the various stages, might be a proof of the embedding of the ovum in the follicle.

Third, probably the formation of the corpus luteum partly assumes the function of the decidua only as a preventive of the invasion of the fetal elements. This view is in marked contrast with the views expressed by Teacher and Bryce, and the behavior of decidua and chorionic elements in their interlacing in the implantation site.

Fourth, decidual formation is only present as an incomplete attempt in the ovarian pregnancy, and is a result of the reaction of the stroma to the specific action of the ovum. Every connective tissue in the genital organs is probably able to react in the same way as the Müllerian to the genetic influence.

Fifth, the incomplete formation of decidua explains the tremendous invasion of the stroma and its surroundings with chorionic elements.

Sixth, this last condition is the cause of early interruption of ovarian pregnancy.

348 EAST 116TH STREET.

REPORT OF TWO CASES OF FORMATION OF AN ARTIFICIAL VAGINA BY INTESTINAL TRANSPLANTATION.*

BY

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New York.

(With two illustrations.)

It is not my purpose to enter here into a detailed consideration of gynatresia. Nor shall I even at this time say more than a few words concerning that particular feature to which I invite your attention; preferring to leave a more extended treatment for a future occasion.

My desire now is simply to place before the Society two additional cases of complete absence of the vagina; and in so doing to evoke discussion as to the best method of treatment of this unfortunate condition.

In devising intestinal transplantation for the making of an artificial vagina Dr. Baldwin, of Columbus, rendered to women thus afflicted

*Read at the Meeting of the Southern Surgical and Gynecological Society, Atlanta, Georgia, December 16-18, 1913.

a service that should command the spelling of his name in glowing capital letters in the world's history of gynecology. The superiority of this device, and especially of the Baldwin method, has again been demonstrated. No other is so satisfactory. No other is nearly so effectual.

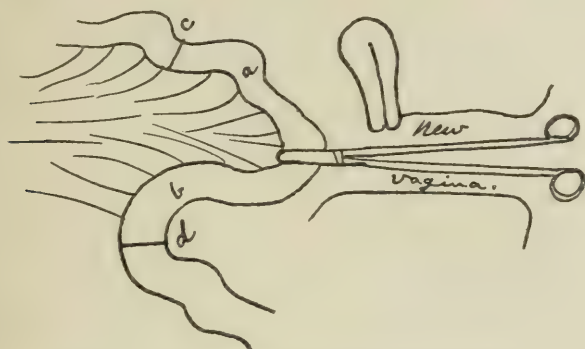


FIG. 1.—a, b, Sigmoid; c, d, points for section.

Personally, I have on several occasions used other methods for overcoming this malformation; but always with resulting failure. Though by one of these I found it possible to make a vagina which, aided by a plug, proved fairly serviceable for a month or two, but the

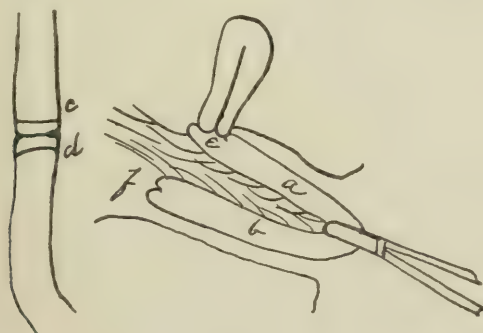


FIG. 2.

invariable result was a gradual contraction of the canal, ending in a condition no whit better than before the operation.

To cite all the cases in which Baldwin's method has been employed is not my present intention. It suffices to say that a sufficient number are on record, unmarred by a single failure—when the technique, as described by him, was properly carried out—to warrant the assertion, not merely that the operation has come to stay perma-

nently, but that it is the one and only form of surgical intervention for the overcoming of that malformation.

Two cases of complete congenital absence of the vagina were my recent good fortune.

1. A. S., aged twenty-three years; referred to me by Dr. Solotaroff. She was married nine months and had never menstruated. For three to four days every month she complained of pain in the left lower abdomen. She had been twice operated upon by a gynecologist of good technical ability—once per abdomen, and once from below—without success. On the contrary, a rectal fistula resulted.

The examination showed a dimple, less than 1 cm. in depth, where the vagina should have been. This connected with a rectal fistula 0.5 cm. in diameter.

Rectal examination disclosed the presence of a small cervix, in contiguity with a uterus, which seemed somewhat harder in consistency, broader and thicker than the normal virginal uterus. On the left posterior surface of this, and intimately attached to it, a smaller mass was felt, very sensitive to touch, and having the shape of an ovary; its surface studded with small, hemp-seed-sized cysts. On the right side there was a similar condition, but the mass was smaller and not quite so sensitive to touch. These two masses were diagnosed to be the ovaries in a condition of small cystic degeneration. The Fallopian tubes could not be palpated.

The plan of operation was outlined to consist of: Opening of the abdomen and freeing of the uterus and adnexa, as is done for a panhysterosalpingo-oophorectomy. Then to eliminate about 10 inches of the ileum to be used as an artificial vagina, restoring the intestinal canal by lateral anastomosis. Because of the mishap to the previous operator, I decided that the making of the canal into which the bowel for the vagina was to be placed, should be left for the last step. With the abdomen open, I believed that in this particular instance, there would be less risk of injury to the rectum when making the canal.

As a result of the previous abdominal operation there were many pelvic adhesions, but none that could not be separated readily. About 6 inches of ileum, next to the cecum, was rather firmly adherent to the posterior surface of the uterus and to the pelvic floor. This had so much evidence of inflammation that it was thought best to exclude it. Hence the anastomosis was made between the cecum and ileum, after excluding this indurated part of the ileum.

With the abdomen open it was an easy matter to make the canal for the vagina and then to close the rectal fistula.

The uterus was amputated to within about 1 cm. of the terminal part of the cervix. A small quantity of comparatively fresh blood was found in the minute cervical cavity.

To form the vagina about 10 inches of ileum was eliminated from the intestinal canal. The median part of the bowel was grasped with a sponge-holder and brought down to the vulvar orifice. The mesentery was, of course, left attached to the bowel, so as to keep

up the circulation. The apices of the bowel were next sutured to the cervical stump with interrupted catgut stitches. The abdomen was then closed. The now proximal coil of the bowel was then sutured to the vulva with interrupted silk sutures. Next, the bowel was opened and the interior wiped out with gauze strips soaked in boric acid solution. The everted bowel was further attached to the vulva with additional stitches.

2. S. P., referred to me by Dr. Bluestone; aged twenty-one years; married eighteen months. This woman gave as her history that she was born without genitals; that she was operated upon in Louisville, Ky., but that the result (as is usual by the customary methods of operation) was complete failure. Her husband then refused to live with her; but he was willing to live with her again, however, if she could be provided with a vagina that would be useful.

There was, in this instance, a rudimentary vagina, about 2 cm. in depth. By rectal examination no pelvic organs were palpated. On opening the abdomen, a rudimentary uterus, about 1 cm. in size, was found on each side, high up in the pelvic cavity. Attached to this was a normal-sized ovary, and attached to the ovary was a rudimentary Fallopian tube, about one-fifth the normal length, but with fairly well-developed fimbriæ. It was spread over the distal part of the ovary like a fan. The adnexum was extirpated from one side for histological examination. Frequent cramp-like attacks of pain in the ileocecal region complained of for a long time previously, found probable explanation in a vermiform appendix which was thickened to about three times its normal diameter, and filled with fecal concretions. In this case fully 12 inches of ileum were excluded from the intestinal canal, for the artificial vagina. Following a lateral anastomosis, the vaginal canal was made. All four ends of the open bowel were closed by a purse-string suture, as in the previous case, and inverted. In this instance it was found that there was much tension on the mesentery, so that, at the terminal end, a small portion of the bowel was deprived of mesentery. The attachment of the bowel to the vulva was accomplished as in the previous case, but at the completion of the operation a clamp was at once placed on the septum between the bowel, whereas in the other instance the clamp was not placed on the bowel septum until after the lapse of five days. This patient, as well as the previous one complained of much epigastric pain while the clamp remained on the septum. When the clamp was again put on for the purpose of causing a slough of the septum of the upper part of the artificial vagina, the pain, which I attribute to pressure on the nerves in the mesentery, was renewed.

The smooth convalescence in the second case was marred by a parietal wall abscess, which, however, cleared up in a few days. It was due to a colon bacillus infection.

PATHOLOGISTS' REPORT ON THE EXTIRPATED ADNEXUM.

Fallopian Tube: The sections show the normal structure of the Fallopian tube: Two muscular layers and a mucous membrane

with the normal papillary outgrowths covered with cylindrical epithelium.

Ovary: The albuginea is thickened and shows new formation of dense connective tissue. The cortical zone shows considerable reduction in the number of the primordial follicles, which are very scarce and embedded in a dense new-formed connective tissue. All the blood-vessels are dilated; the sections show in many places interstitial hemorrhage.

Diagnosis.—Atrophied ovary.

Rudimentary Uterus.—Sections show a connective-tissue stroma with numerous fascicles of smooth muscle fibers, the course and arrangement of which are irregular, crossing and interlacing.

Diagnosis.—Smooth muscle tissue; rudimentary uterus.

39 EAST SIXTY-FIRST STREET.

CESAREAN SECTION FOR COMPLETE PROLAPSE OF THE CERVIX

BY

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(With one illustration.)

MRS. McC., American, aged thirty-one, housewife, spare figure, para-iv. She says that the womb "came down," at the third month of her third pregnancy, four years ago. No medical attention was given it, until labor began spontaneously at the seventh month. At that time the physician found the cervix entirely outside the body, active pains had been going on for forty-eight hours, with little or no change in the extruded cervix, and the general condition good. Recognizing the emergency, two surgeons were called in counsel. She was taken at once to a hospital and preparations made for a Porro operation. Happening to be at the hospital when asked to see the patient, I found the fetus apparently dead. Therefore I suggested a tentative trial of vaginal delivery before assuming the risks of an hysterectomy. We succeeded in dilating the cervix without great difficulty, and extracted a dead child by podalic version. The lying-in was uneventful.

I was called to see her on Friday, December 12, 1913. I learned that the cervix had remained outside the body since our delivery, four years ago; she was exactly at term, in good physical condition, and not in labor. Abdominal examination showed a large child, with heart sounds loud in the right lower quadrant (R.O.P.). The cervix was club-shaped, fully as large as the double fist, the whole surface about the external os was deeply eroded in a ring perhaps 3 inches in diameter, and the canal was not dilated. I advised Cesar-

ean section for the following reasons: the almost certainty of serious laceration in forcibly dilating the unnatural cervix, the probability of carrying infection from the erosion into the uterine cavity, and the risk to the child's life in dragging a posterior position through the long canal by forceps or by version. Laceration, infection and a dead child against a clean laparotomy and a living child! The patient elected the section, and entered my service in the Maine General Hospital the next afternoon.

Section was begun on Sunday at 11 A. M. When etherized a double laceration of the external os was found, with ectropion and



FIG. 1.—Complete prolapse of uterus necessitating Cesarean section.

extensive erosion of both mucous surfaces. The cervix was estimated to be the size of the double fist, the neck filled tight the pelvic opening and must have been 3 or 4 inches in diameter. No attempt was made to accurately measure the mass, owing to fear of infecting the canal. The surface of the tumor was wiped over with tincture of iodine, but none applied inside the canal, and the whole wrapped with iodoform gauze and bandaged. In catheterizing, the bladder was felt to be almost entirely outside the pelvis, being dragged out with the cervix.

The uterus was opened *in situ* through the high abdominal incision of A. B. Davis, and a living female child, weighing 8 $\frac{3}{4}$ pounds, extracted by the feet. After delivery the inside of the uterus was wiped dry with gauze, but no attempt made to dilate the internal os from within. Hemorrhage was moderate. The uterus was closed by interrupted, deep and interval sutures of chromic gut, and the abdomen by the usual technic. Time of operation thirty minutes.

Special attention was given after operation to the dressing of the exposed cervix, because of dread of infecting the uterine wound and cavity from the erosion. For the first thirty-six hours there was entire absence of lochia. Fearing the canal might be blocked by the normal mucous plug, or by membranes or a clot, I passed a large, soft-rubber catheter into the uterine cavity, through which drainage began in moderate quantity. The catheter was removed after twenty-four hours, and thereafter discharge was regular though smaller than usual. The lying-in was uneventful and afebrile except on the fourth day, when the milk came accompanied with the ordinary temperature of 100°. Lactation was normal. The patient was out of bed on the eighth day and home on the fourteenth. Since operation the only complaint is a dragging feeling in both sides due to the weight of the exposed cervix, which is relieved by a pelvic girdle of wide adhesive plaster.

The woman will reenter the hospital for panhysterectomy as soon as involution is finished.

It has seemed to me that the above case of Cesarean section for complete prolapse of the cervix is worthy of record. The complication with pregnancy at full term, and its modern treatment by laparotomy is uncommon. The condition must be rare in obstetric experience, since it is given scanty notice on text-books. Even without pregnancy so large a prolapse is a curiosity of gynecology, as operators of large experience assure me. In a midwifery service of forty years, in private and hospital, I have never seen its like. That a young woman could have endured the discomforts of pregnancy and delivery with such a sensitive and infected tumor without serious illness, if nothing more, is almost incredible. She tells me that for four years she could sit down only upon a chair with a hole in the seat to relieve pressure on the mass. It must have been covered with urine and feces, or menses, the greater part of the time. And why she did not die a dozen times from sepsis is one of the wonders of the female organism. She is a sensitive woman, unused to doctors, and at first objected strongly to the necessary examinations. Why she did not have uterine colic after every connection—for intromission could have been only directly into the cervix—is also one of the mysteries of the case. I never had a Cesarean I dreaded more, nor ever had one more successful.

150 HIGH STREET.

THE NEWER CONCEPTION OF SYPHILIS AND
PARTURITION.*

BY

RALPH WALDO LOBENSTINE, M. D.,

New York City.

"SYPHILIS makes the soil for the seeds of tuberculosis by lowering the resistance of all the organs of the body; it is the greatest cause of early infant mortality, diseases of all kinds affecting the nervous system, and the sole cause of the most terrible of all forms of insanity, viz., general paralysis." (F. W. Mott, London.)

It is beyond our power, at the present time, to accurately compute the extent of the distribution of syphilis. This difficulty is to be found at all stages of the development of the individual. Public medical statistics have been peculiarly unreliable in this country, and this is especially true in regard to the registration of births, stillbirths, at term or not, abortions, and the numerous complications so frequently arising in the course of parturition.

Lee W. Thomas, in a recent study, states that out of 1867 still-birth certificates examined in New York City, 41.5 per cent. failed to give a real explanation as to the cause of death. A change for the better, however, is in progress. Interest in vital statistics is growing throughout the country. The recently established Children's Bureau in Washington is rapidly endeavoring to compile valuable data concerning infant mortality and morbidity. The latest reports of this bureau show that slightly more than 42 per cent. of the infants dying under one year of age, in the registration area, in 1911, did not live to complete the first month of life; and that, of these 42 per cent., almost seven-tenths died as a result of conditions existing before they were born, or of injury or accident at birth. Of these that lived less than one week about 83 per cent. died of such causes, and of the number that lived less than one day, 94 per cent.

The part that syphilis plays in this terrible sacrifice of infant life will be gradually revealed with a more general use of the Wassermann, Noguchi and Weil reactions, and with compulsory and thorough registration throughout all the states of the Union. Syphilis

* Read at a meeting of the Lenox Medical and Surgical Society, New York, November 22, 1913.

will then be found to be, even by the sceptic, a widespread curse, and a source of gravest menace.

Its powers of destruction are greatest during intrauterine life and early infancy, and yet it may kill, often insiduously, at any period.

Why this invalidism? Why this wholesale murder? Why the wrecking of many homes? Ignorance! Indifference! Ostinacy on the part of the physician! Prudery!

Syphilis is, of all the more common diseases, the one most to be dreaded, because of its ravages upon the innocent.

It is of the ravages of parental syphilis upon the unborn child, and upon the child in its early years of life, that I wish, in particular, to speak this evening.

(1) *In what manner does the infection of the offspring take place?* There must obviously exist several channels through which this infection occurs. The exact mode of infection in any given case may be uncertain. The transmission of the virus takes place:

(a) *Through infected semen.* The infection of the ovum by specific semen at the time of conception must be of frequent occurrence. This is regarded by many as the most common avenue of transmission, when the male is suffering from a florid syphilide.

(b) *Through an ovum already infected at the time of contact with the spermatozoa.* Conception may take place under these conditions, and yet it is hard to believe that this is at all common.

(c) *Through the placenta.* Whether or not the spirochætæ pallidæ (as well as other organisms) can pass to the child through an undamaged placenta is as yet not clear. Syphilis, as we know, produces certain definite changes in the placenta, the most typical of these, being as follows: The syphilitic placenta is larger and thicker than the normal. It becomes paler in color and if the fetus is dead it usually has a dull grayish (fatty) appearance. The normal placenta weighs approximately one-sixth to one-eighth of the weight of the child, while the syphilitic placenta reaches to within one-quarter to one-third of the child's weight. The villi are found to have lost their arborescent appearance and to be thicker and more or less club-shaped. There is a decrease in the number of blood-vessels with a marked proliferation of stroma cells. True gummata are rare.

(d) *Infection may arise at the time of labor from infected cervical secretion, or from active lesions in the lower genital tract.* It is my personal belief that intrapartum infection is not infrequent. The theory advanced by von Gräfenberg (*Arch. f. Gynäkologie*, Band

lxxxviii, Heft, 1), that, in such cases, a small primary lesion may be found (or, if not found, at least exists) in the nose of infected infants—thus in many cases, accounting for the inevitable snuffles, and, later, for the saddle-nose—is well worth further investigation.

(e) *Early postconceptional syphilitic infection is possible, but rare.* We see, then, that the antenatal infection of the offspring is still shrouded in a considerable degree of uncertainty.

(2) I have attempted, so far, to briefly emphasize the fact that, since the discovery of the Wassermann reaction, syphilis has proven to be a common disease, and to exist, in latent form, in widely different groups of individuals.

I will now ask you to consider with me the two universally accepted laws, viz., the "Law of Colles" and the "Law of Proféta," in the light of recent investigation.

We shall presently see that, owing to the blind acceptance of these dicta, many misconceptions have existed, and many grave errors have been made in the past, and are, I fear me, still occurring to-day.

So far as I have studied the literature on the subject we are discussing, only one American text-book on obstetrics presents it in the important light which it demands.

(A). *Is Colles' Law sound?* According to this law a mother may bring into the world a macerated or nonmacerated syphilitic infant, and yet at no time herself show any evidence of syphilis. In other words, she is considered immune to the disease. The Wassermann reaction has conclusively shown that these women are not immune against syphilis, but are apparently immune merely because they themselves have an inactive or latent syphilis. Of 125 mothers (quoted from Reuben, *Archives of Pediatrics*, June, 1911) who had at no time been given specific treatment, nor had presented signs of syphilis, but who gave birth to syphilitic infants, 71 per cent. gave a positive Wassermann reaction after labor. Of twenty-five mothers with symptoms of syphilis, some of whom had been ineffectually treated with mercury, approximately 71 per cent. likewise gave a positive reaction.

In eight other cases reported by O. Franke (*Monatsschrift für Gynäkologie*, March, 1910), the mothers were apparently sound and free from all evidence of syphilis, but the offspring were undoubtedly specific; maceration existed in six cases, and the two living children presented the lesions of pemphigus. Both of the latter gave a positive Wassermann reaction; all the mothers, some-

what later, likewise gave a positive Wassermann, and two of the number developed typical syphilides.

F. W. Mott (London, 1913) recently stated that he believed that "all mothers of congenital syphilitic children give a positive Wassermann reaction."

The exact percentage of positive Wassermann reactions must, naturally, vary according to the stage of the disease at which the blood is examined. Furthermore, it depends upon the personal experience of the investigator.

Reuben demonstrated this very accurately from the results in 4500 cases in nonpregnant syphilitics, collected from Knopfmacher, Michælis, Noguchi and Kaliski:

(1) Cases with primary lesion gave a positive Wassermann in 78 per cent.

(2) Cases with secondary lesions gave a positive reaction in 92 per cent.

(3) Cases with tertiary lesions gave a positive reaction in 82 per cent.

(4) Early latent cases gave a positive reaction in 72 per cent.

(5) Late latent cases gave a positive reaction in 58 per cent.

Pregnancy does not modify these findings in the nonpregnant.

(B) *Is Profêta's Law sound?* Briefly stated, this law maintains that a specific parent, or specific parents, may give birth to a non-specific child, that is, that the child can develop immunity in intra-uterine life. If such an immunity exists, it would depend, as shown by Ravogli (*Lancet-Clinic*, May, 1905), either upon impermeable placental tissue, or upon the saturation of the fetus with antigens from the mother. This view is supported by Ricord, Caspray, Bruggeman, and Glück; but there are many exceptions discovered with the Wassermann reaction, and we now believe that no such immunity can exist. Those very rare cases in which an infant apparently escapes infection are dependent, not upon immunity, but upon the well-known fact that "the syphilitic virus shows a natural tendency to lessen in virulence with passing years."

I myself have seen several instances of children who, apparently, had escaped infection *in utero*, and who were supposed to have acquired immunity, and yet who, at a much later date, developed the disease actively. Only recently such a case came to me, in which the mother gave her young child a primary lesion of the tongue from a mucous patch in her own mouth.

(3) *How does the syphilitic virus in the parent affect the offspring?*

(a) Intrauterine death or intrapartum death is very common. The dead-born fetus is, in nearly all cases, macerated.

This intrauterine death rate is very high, it amounts to between 40 and 50 per cent. of all pregnancies infected with syphilis. When the father alone is infected at the time of conception, the fetal mortality is from 35 to 40 per cent.; when the mother is likewise infected at the time of conception, the mortality ranges from 60 to 90 per cent. On the other hand, the chances of the child are greatly enhanced should the mother not contract the disease until late. Ninety per cent. of macerated fetuses are syphilitic.

V. Gräfenberg has shown that the spirochætæ may be found in the organs of the macerated fetus, as well as in the nonmacerated. He believes that if they are not found with diligent search the evidence is strongly against syphilis. Thirty-nine out of fifty macerated infants at the Frauen-Klinik at Kiel showed spirochætæ with the Levaditi or Sacurane stain. Of those infants that escaped intrauterine or intrapartum death, fully 75 to 85 per cent. died within the first year of life. Of 904 infants collected by Reuben born alive of syphilitic parents, 768, that is 85 per cent., died the first year. Ravogli has called particular attention to the irregular action of the syphilitic virus in respect to infant infection. One child may be born healthy and the next one not, even though there has been no fresh infection. This is not, however, the rule.

The spirochætæ are unevenly distributed in the different organs. They may remain dormant or negative for long periods, so that only the active ones may be reached by the mercury or arsenic.

(b) The child, if born alive, may be apparently strong, and yet present the skin lesions of congenital syphilis, particularly pemphigus.

(c) It may be born alive, but is puny, undernourished, with rhagades around the nose, mouth and anus.

(d) Not infrequently it is apparently normal for from one to six or eight weeks, and then develops typical signs of hereditary syphilis.

(e) It may be born alive, but deformed, or may not show signs of hereditary syphilis for many years.

Rudeaux and Le Lorier (*Annales de Gynécologie*, Sept., 1911) from studying a series of 324 collected cases, concluded that syphilis was a factor in producing monstrosities and deformities in 14 per cent. of the cases, especially hydrocephalus and spina bifida. In 74 per cent. of malformations of the head, syphilis was in the foreground.

Sauvage, on the other hand, claims to have had eighty-five syphilitic infants without a single deformity.

(f) Very rarely a child may be born free from syphilitic taint. Such a child has actually escaped, but not from immunity.

Lastly, latent syphilis in both parents may give no active signs in the offspring, but merely a syphilitic taint.

The most striking signs of the tainted child are lack of vitality, and, with this, diminished resistance, especially to gastroenteric diseases, and joint and bone tuberculosis.

(4) *Is the Wassermann reaction of value in the child?* Holt (AMER. JOUR. OBST., June, 1913) in order to show the value of either the Wassermann or Noguchi reaction in infants and children, has shown that in thirty-one cases of hereditary syphilis, thirty gave a plus reaction, the one not reacting having had mercurial inunctions for three months. Nine of the positive cases had also been treated for a while with mercury, thus illustrating the uncertainty of the mercurial treatment.

Holt further states that in 178 tests made in children having no definite signs of syphilis and no history thereof, a plus Wassermann reaction was only obtained in eleven cases, and five of these were later quite clearly proven to be specific. La Fetra, in eighty-two cases examined by the Wassermann reaction, two or more times, found that syphilis was present in forty-four cases in which it was suspected, and fifteen times when it was not suspected. He asserts, very rightly, I believe, that these reactions are of great value in diagnosing the numerous uncertain skin eruptions of infancy.

Despite all the enthusiastic reports on the value of the Wassermann reaction in children, we must, however, admit that there exist some dissenters, among the latter are to be found such men as A. Gallico, Dalla Fevera, Flamini, Serra and others.

Gallico, in the years 1901 and 1910 found, in the "Polyclinic" in Rome, that the reaction failed in thirty-one out of sixty-four undoubted cases of syphilis.

These divergent findings are somewhat mystifying, as the figures are collected from thoroughly reliable sources. I think, however, we may safely conclude that, with a proper technic, congenitally syphilitic infants will give a positive Noguchi or Wassermann reaction in a preponderately large percentage of cases.

(5) *Salvarsan and mercury during pregnancy.* Those of us who have had the opportunity of following a considerable number of women during pregnancy, suspected of having syphilis, or who

were known to have had the disease, have, I am sure, been struck with the uncertainty in the results upon the offspring when mercury is used.

These unsatisfactory results are seen more frequently when the inunction treatment is used than with the use of mercurial injections. Such results are not only unsatisfactory from the standpoint of the child, but likewise at times unsatisfactory to the mother also.

In 217 cases collected by Sauvage (*Annales de Gynécologie*, Jan., 1913), it was found that 133 (that is, 61 per cent.) presented evidences of the disease at the time of labor, despite treatment with mercury. The fetus was dead born, or died soon after birth, in seventy-four cases (or 54 per cent.); of the others, ten early developed signs of syphilis.

These results, I feel sure, can be improved upon by the early and systematic use of the injection treatment of mercury throughout the entire pregnancy.

Salvarsan affords greater hopes of success, especially when combined with injections of mercury.

The drug has its dangers when used during pregnancy, but these dangers are not very great. It is not safe in the presence of the toxemias of pregnancy, or in the presence of any type of involvement of heart, kidneys or liver.

An occasional maternal death has been reported from its use. In 606 cases reported in Paris, up to the year 1913, two deaths during pregnancy were attributed to the arsenic. Salvarsan is said to be occasionally responsible for intrauterine death of the fetus. This is unquestionably rare, the child's movements may become temporarily less active after the injection, but this phenomenon is transitory.

Salvarsan is believed at times to produce a tendency toward premature labor, or abortion. Such a tendency can properly only exist in women particularly susceptible to this complication, and in those who have either been treated with maximum doses, or who respond unusually actively to the drug.

Sauvage, in eighty-four cases, had thirteen that went into labor the week after an injection, ten of these were at term, or close to term. There were no fetal deaths from the arsenic.

In another series of ninety-one cases, with the fetus alive at the time of the treatment with arsenic, Sauvage found that eighty-four infants were born alive; of the other seven, two died by accident of labor, and five were macerated.

J. Lemenland (*L'Obstetrique*, April, 1911) in a group of thirty-two cases treated with salvarsan during pregnancy, found that thirty infants were born alive.

Jeauselme reports fourteen women treated with arsenic producing fourteen living babies (*Annales de Gynécologie*, January, 1913).

With the above figures as indicative of what can be accomplished by judicious treatment during pregnancy, we conclude that salvarsan alone, or better when combined with mercury, does not injure the child, but, on the contrary, seems to be a life-saver and a life-giver, to the highest degree. The action of the arsenic protects the child until the birth, and then its action ceases, in large measure.

Salvarsan in the presence of active lesions during pregnancy causes these to disappear in a short space of time, in about 90 per cent. of the cases; while mercury accomplishes this result, as we have seen, in not over 40 per cent.

The end result, as to life at birth, would seem to be about this:

With salvarsan the intrauterine death rate is about 15 per cent., with mercury, as commonly used, about 60 to 70 per cent. This figure drops to about 35 to 40 per cent. when the injections are used regularly throughout the entire period of gestation.

SUMMARY.

(1) All mothers suspected of a specific taint should have the blood examined for spirochætæ.

(2) All mothers with a positive reaction, even though without symptoms, should receive energetic treatment; such treatment should consist in the use of both arsenic and mercury.

(3) Every woman who has at any time shown a positive reaction should have her blood periodically examined during the child-bearing period; for in this way alone can the most permanently good results be obtained for the offspring.

(4) All suspected fathers should have the blood examined, and those with a positive reaction should be forced to undergo active treatment.

(6) *The care of the child after birth.* All children born of suspected parents, or of parents who have given a plus Wassermann reaction should have their blood examined soon after birth. They should receive active treatment, whether with or without symptoms, in the presence of a positive reaction. I would go even further than this, and I would advise treatment even in the absence of a positive Wassermann, should the parents have been positive to syphilis.

Thorough treatment of the mother during pregnancy does not lessen the necessity of treating the child after birth.

Indirect treatment of the nursing child through the mother's milk, by active treatment of the mother, is uncertain. The child should be treated preferably directly with arsenic and mercury.

It is unnecessary at this time to be dogmatic as to the exact method in which this fundamental principle is to be followed, suffice it to say that small doses of arsenic given intravenously at intervals varying from a few weeks to several months, supplemented by prolonged treatment (that is six months to a year) with mercury in the form of inunctions, will, without doubt, offer to the little patient the greatest hope of health and happiness, and freedom from the scourge of syphilis.

162 EAST SEVENTY-FIRST STREET.

A CASE OF EXTENSIVE RUPTURE OF THE UTERUS IN THE FIFTH MONTH OF GESTATION; SUPRA-VAGINAL HYSTERECTOMY; RECOVERY.*

BY

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RUPTURE of the uterus during labor is a not infrequent occurrence, but a transverse supracervical rupture of the pregnant uterus at five months is sufficiently rare to justify a record and a discussion of the case.

The patient was a primipara; aged nineteen; family and personal history negative; married in December, 1912; menstruation missed in December and January, with normal periods in February, March and April; menses ceased in May and until November 20 there were clinical signs of normal pregnancy; preparations were being made with the greatest pleasure for the coming child.

On the morning of November 20, slight pains began, and on examination by the attending physician gave doubt as to the question of tumor or premature labor; pains continued intermittently until the 23d, when they became very severe. A consultation was held by two skilled physicians and after an examination under chloroform, though the external os was rigid and would not admit the finger, and there was but slight blood staining, a diagnosis of probable placenta previa was made.

The patient was ordered to the hospital and in the ambulance severe hemorrhage occurred with the extrusion of a five months fetus and placenta.

*Reported before the Chattanooga (Tenn.) Academy of Medicine, Dec., 1913

The house surgeon not knowing that the miscarriage had occurred, took her to the delivery room and upon examination found the omentum showing at the vulva, and the vagina filled with the omental mass, which came through the dilated cervical canal. A diagnosis of ruptured uterus was at once made.

When I reached the hospital shortly afterward, the woman was blanched and pulseless. Hypodermoclysis was being given during the wait. The protruding omentum and the bogginess of the abdomen confirmed the diagnosis, and under light ether anesthesia the abdomen was opened, the free blood, with practically no clots was quickly removed and the broad ligaments clamped. The hand introduced behind the uterus passed through a transverse tear just above the cervix admitting three fingers, and followed the mass of omentum into the vagina.

The omentum was cautiously withdrawn, wrapped in hot salt gauze, and laid aside. A supravaginal hysterectomy following the line of the tear, was made, and the cervical stump covered loosely with peritoneum. The contaminated portion of the omentum was ligated in sections and removed, and the abdomen closed with a large rubber tube to the culdesac.

The patient was *in extremis* from shock and hemorrhage throughout the operation which consumed twenty-five minutes, and continuous hypodermoclysis and stimulants were given. After being put in a warm bed with the foot elevated, and a continuation of salt solution, the pulse dropped to 140 and of good volume.

After twelve hours of the dorsal position she was placed in the exaggerated Fowler position. Hiccoughs and vomiting persisted for two days, but the condition rapidly improved. Liquid food was retained on the fourth day; drainage tube removed on the seventh day, and the subsequent recovery was uneventful, the patient leaving the hospital on the twenty-fourth day.

The most natural supposition in this case would be the introduction through the cervical canal of a blunt instrument which perforated the posterior uterine wall.

This is precluded by several facts:

1. Repeated grilling inquiries failed to substantiate even a suspicion of interference, but, on the contrary, a normal womanly desire for a child.

2. The intermittent pains began on Tuesday and continued, with gradually increasing severity, until Friday noon, when she was still able to sit at the table and eat a hearty meal (part of which she vomited during anesthesia).

3. Vaginal examination at 5 P. M. Friday, at consultation, showed an os which would not admit one finger, yet with persistent violent labor pains.

4. There were no evidences of peritoneal irritation at this time, as shown by absence of fever, chills, vomiting or meteorism.

5. If an instrumental perforation had occurred on Tuesday, there would have been shock and hemorrhage before Friday afternoon, which were positively stated as absent by the two reputable consulting physicians.

I fully recognize the fact that without a positive and searching history in such a case, great doubt would naturally be thrown about a rupture from intrinsic causes, of a uterus but five months pregnant.

A microscopic examination in the case reported, of the sections from the edge of the lacerated uterus, showed no histologic or pathologic changes.

With the absence then of all extrinsic causes, with the presence of a rigid, closed os, and with violent and persistent labor pains, there is here the probability of a rupture occurring through a segment of the uterus which had been thinned and weakened by a preexisting acute retroflexion. This theory is further substantiated by the statement of the physician making the first examination on the 20th, shortly after pains began. At this time the cervix was pointing acutely backward to the sacrum.

With the advance of labor and the advent of unusually severe pains, with a rigid os, it is thoroughly conceivable that as the cervix softened an area of extreme thinness or degeneration existed in the uterine wall at the point of acute flexion, which eventuated in a rupture. Subsequent severe pains enlarged the tear, while the external os released from tension, softened and dilated.

Freud considers that rigidity of the external os, *per se* may bring about rupture, but one would surely have to eliminate a co-existent degeneration of uterine muscle.

A low, posterior implantation of the placenta must also be mentioned, for under certain conditions the chorionic villi(1) may possibly have a specially destructive effect, by burrowing unusually deeply into the wall.

Dawidoff and Poroschim(2) have suggested that rupture may be due to deficiency of elastic fibers in the tissue of the uterus in the neighborhood of the rupture, but Pick(3), Ivanhoff(4) and others have not confirmed that theory.

Hellendall(5) recorded in 1906 a rare case of rupture of the uterus during pregnancy, the third case of its kind reported in the literature. The patient, a para-xi, forty-two years old, had signs of perforative peritonitis upon admission, pains soon began and a five months fetus was delivered. In the upper part of the fundus there was found an opening admitting two fingers which communicated with

the peritoneal cavity. A vaginal hysterectomy was performed but the patient died four hours later.

Weiss(6) reports a primipara aged thirty who entered the hospital with threatened abortion, which later became inevitable. Tamponade was employed for a few days, as the hemorrhage was rather copious and the cervix dilated slowly. A five months fetus was expelled. Examination revealed a tear in the anterior portion of the cervix which reached to within 1 cm. of the external os; that the fetus had been extruded through this rent was shown by the fact that the cord protruded from it and the external os admitted but two fingers.

Gaus(7) refers to several cases in the literature where rupture *at term* had followed perforation after curettage. Eckstein(8) holds that spontaneous uterine rupture may at times be traced to an old laceration, injury or inflammation sufficient to produce scar tissue, but without symptoms.

The available literature contains very few reports of rupture of the uterus as early as the fifth month.

The disposition of the ruptured uterus depends largely upon the location of the tear. If the fundus has ruptured and it is wholly accessible it may be treated as a Cesarean section wound and closed in layers. But where the rupture is transverse and just above the cervix, a supravaginal amputation is clearly indicated. The dangers of infection are less, the operative time is materially shortened, and the patient is not exposed to a similar accident at a subsequent pregnancy.

The mortality in this emergency when occurring at full term has been exceedingly high.

Kerr(9) reports fourteen cases of rupture of the uterus. Three women died shortly after operation from shock and four from sepsis. Two women not operated upon (both complete tears) died. Three women (incomplete tears) recovered. One case treated by supravaginal hysterectomy died. Of five cases treated by supravaginal hysterectomy three died. Of three cases treated by complete hysterectomy two died.

Of the seven deaths that occurred in the first 10,000 cases treated by the Chicago Lying-in Hospital Dispensary, five were due to rupture of the uterus. DeLee believes the rôle of placenta previa in causing rupture of the uterus is not sufficiently appreciated. He quotes Ivanhof as reporting 130 cases of rupture of the uterus at the placental site.

The present case is reported largely because of the rarity of spon-

taneous rupture at five months, and despite transportation over several miles to a hospital with the omentum protruding and contaminated, and the patient in shock and exsanguinated by an emergency supravaginal hysterectomy, recovery ensued.

REFERENCES.

1. Kerr: Operative Midwifery, p. 620.
2. *Zent. f. Gyn.*, 1898, p. 183.
3. *Berlin. klinische Wochenschr.*, 1900, xxiii.
4. *Annal de Gyn.*, Aug.-Oct., 1904.
5. *Arch. f. Gyn.*, vol. lxxv, H. 3.
6. *Zentralblatt f. Gyn.*, Feb., 1903, quoted by DeLee.
7. *Deutsch med. Wochenschr.*, 1908.
8. *Zentralblatt f. Gyn.*, vol. xxxii, No. 29.
9. *Jour. Obstet. and Gyn. of Brit. Empire*, July, 1908.

CLONUS IN THE TOXEMIA OF PREGNANCY.

BY

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IN the preeclamptic stage of gestational toxemia, the occurrence of muscular irritability, as evidenced by twitching, is a well-known sign of danger.

Ordinarily, according to familiar observation, eclampsia is preceded by the usual suggestive indices. The appearance of more or less conspicuous clonus in pregnancy, apart from special tetanies (epilepsy, chorea, or other) requiring diagnosis and management, commonly means that toxic products have accumulated to the very threshold of an eclamptic attack.

Such a condition too frequently connotes negligence on the part of patient, physician, or both.

Negligence is almost always limited to the patient, and, in her case, is due to ignorance of the significance of preeclamptic signs.

In large centers, popular education is rapidly reducing this ignorance. Dispensary and other free service act opportunely to prevent many toxemic cases. It is in remote, rural regions that education progresses most slowly, owing to the difficulty with which such teaching is distributed. This difficulty has led to the use of educational books, leaflets, and various publications.

It is desired briefly to call attention to the importance of muscular twitching as a warning sign. Rural practice of some twelve years

serves to point out the fact that patients who live at considerable distances from physicians, and, especially, patients who, besides being isolated, are more or less limited in means, frequently neglect the less obvious indications of toxemia and impending eclampsia.

For this reason, educational material should lay great stress on the importance of every symptom caused by toxemia, and special emphasis should be directed to the imperative character of the warning given by preeclamptic muscular tremor and clonus.

No book for prospective mothers, no leaflet prepared by nursing or other charitable organizations, no printed helps issued for this sort of prophylaxis, should fail to devote particular reference to this grave warning, which is not unusually the most conspicuous and the last signal which may save the patient's life.

So necessary has it appeared to call attention to the point thus emphasized, that thorough correspondence with representative obstetricians and gynecologists has just been concluded. Agreement is complete that preeclamptic clonus is a useful sign, important in the prevention of eclampsia.

The writer urges this point upon all those who are concerned in the work of prenatal instruction. Among all the evidences of toxemia, there is not one which points so forcibly to its presence, not one which indicates so positively the exhibition of active measures of elimination or more urgent treatment, such as bleeding or evacuation of the uterus.

Appreciation is hereby expressed of the services rendered by those contributing to the correspondence concerned in preparing this paper.

2814 ADAMS MILL ROAD.

THE COLON BACILLUS INFECTIONS OF THE URINARY TRACT IN WOMEN.*

BY

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In the short time I have had to write this paper it has been impossible for me to gather statistics and to give references. My endeavor has been to prepare an article that is an expression of my ideas as a result of the study of the literature and my clinical experience, and no attempt has been made to make the paper comprehensive.

* Read at a meeting of the New York Obstetrical Society, December 9, 1913.

By far the greatest percentage of infections in the urinary tract in women are due to the colon bacillus.

Baisch claims that other organisms are frequently the primary infectors, and that they are subsequently supplanted by the colon bacillus, but as most cases are seen late in the disease it is difficult to determine the worth of this assertion. Fully 90 per cent. of the cases I see show the colon bacillus in pure culture.

Method of Entrance of Organisms.—Many observers contend that the ascending infections predominate in women, this being due to the short urethra and its location, where it can be easily infected. They cite as an argument in its favor the greater proportion of pyelitis cases in girl than in boy children. Equally competent authorities believe that most of these cases of infection are hematogenous, and explain the larger number seen in girls as due to the entrance of bacteria through excoriations around the anus and vulva caused by irritating discharges.

The colon bacillus is not capable of passing through the normal intestinal mucosa unless the patient is debilitated by grippe, tonsillitis, etc. Patients suffering with diarrhea, constipation, fistula, fissure, hemorrhoids, etc., frequently present lesions of the intestines permitting the colon bacillus to enter the general circulation.

There is a close relationship between appendicitis and colon bacillus infections of the kidney, many of which give a history of previous chronic appendicitis.

Recently I saw a patient who for some time had had chronic appendicitis, and who then had an acute attack of pyelitis. Upon recovery from the pyelitis, the patient had an acute attack of appendicitis that necessitated operation.

I think that many of the cases of postoperative temperature, where there is no trouble to be found at the site of operation, or in the lungs, are due to infections of the kidney, and that in many of these the colon bacillus is the organism at fault. I collected nine such cases of postoperative renal infection, and in most of these the operations had been upon or in close proximity to the intestinal tract. While some of these infections may have been of the ascending type, I believe that the majority were of hematogenous origin and in all probability due to the breaking up of infected thrombi at the seat of operation.

It has been proven that the kidneys are capable of excreting pathogenic organisms without themselves becoming infected, and that agencies which tend to produce obstruction, or congestion in any part of the urinary tract, such as floating kidney, renal or ureteral

calculi, strictures of the ureter, malposition of the uterus, pelvic tumors, pregnancy, exposure to cold, etc., favor infection. I have been impressed with the importance that chilling from exposure to cold plays in these cases. It certainly aggravates existing infections, and I have seen a number of cases in which I thought it was the exciting cause.

These infections may be insidious in their onset and chronic in their course, or else sudden and acute, marked by chills and temperature and evidenced by symptoms referable to the kidney, bladder or urethra, or there may be an entire absence of all local symptoms. Some of the acute renal infections give the appearance of a grave illness, and at first, unless one is on the look-out for such a condition, may be wrongly diagnosed. It is essential to determine the seat of the lesion and the infecting organism, as the colon bacillus cases are not as serious as other infections, and a waiting policy is justified and advisable.

I believe that many kidneys have been needlessly sacrificed by too early interference. It is frequently very difficult to diagnose such cases, as there is often an entire absence of pain and little or no pus is to be found in the urine at first.

Most of the cases of chronic colon bacillus pyelitis that we encounter are in the beginning hematogenous infections of the kidney with subsequent involvement of the pelvis, where the infection is perpetuated. Anything that tends to obstruction of the urinary tract contributes to the continuation of the infection.

Voelcker recognizes two principal forms of infection of the kidney; one, where the fornices are involved and in which through ulceration a large pus kidney is formed, and another, of infection of the already dilated pelvis, where the obstruction is mechanical. The degree of functional damage depends upon the amount of pressure atrophy, and the nephritis that is so often present in these cases. In some the insufficiency is practically nothing, and in others there is a complete destruction of the kidney.

On the whole I think that the cases of moderate dilatation with periodical attacks of retention, as evidenced by pain and temperature, are the most annoying. The big pyonephrotic cases come to operation and the patient is relieved. In cases of pyuria and bacteriuria with no symptoms of retention, the patient has practically no discomfort other than some vesical or urethral irritation.

Treatment.—In every case of renal pyuria, tuberculosis and stone should be excluded by microscopical examination of the urine, animal inoculations, and radiographs of the entire urinary tract. In tuber-

culosis cases there are seldom any other organisms than the tubercle bacillus found.

In some stone cases with pyuria the colon bacillus may be found in pure culture.

While I cannot prove it I believe that most cases of cystitis are due to colon bacillus and are secondary to a hematogenous infection of the kidney, and that in many of these infections, the bladder symptoms are the first and only ones to appear. In some instances I have obtained perfectly clear urine from the kidney where there was an acute cystitis, but this urine on culture showed the colon bacillus. A striking case was that of a woman who had a rectovaginal fistula, in the wall of which was a little pocket containing fecal concretions. She had had a number of attacks of acute colon bacillus infection of the kidneys and the right had been removed. When I saw her she had been suffering for two years from marked urethritis. Following the removal of this kidney she had about two or three attacks a year.

In December, 1913, the patient had a sudden chill, with rise of temperature to 104° F. and this was repeated from once or twice a day to every other day for three weeks, and she gave the appearance of being a very ill woman. There was marked pain in the region of the kidney; the bladder urine showed a large amount of pus, and cystoscopy an acute cystitis. Thinking the cystitis secondary to a pyelitis, and that she would receive benefit from a pelvic lavage, the ureter was catheterized and I was surprised to find perfectly clear urine coming from it, which upon examination was found to contain colon bacilli in pure culture. I have never seen an uncomplicated cystitis give such pronounced systemic disturbance, and I am forced to conclude that this patient had an acute infection of the renal parenchyma with a secondary cystitis.

In some instances I have seen very turbid urine, due to myriads of bacteria, from a bladder in which there was no evidence of cystitis, and in which the kidney urines showed only slight cloudiness. This, I believe is due to the rapid growth in the bladder of the bacilli from the kidney urines. The same thing happens with infected urine that is allowed to stand for a time in a warm place.

Before instituting any treatment in the kidney infections, it is essential to know that they are free of stone, and also to estimate their functional capacity. In those cases where the kidney function is completely destroyed or very markedly decreased, nephrectomy is preferable to any conservative treatment.

As the time is limited and the scope of this paper would be too much extended, I shall speak of only a few of the points in treatment.

In pyelitis cases, especially those of pregnancy and the puerperium, that have failed to respond to other treatment, lavage of the kidney pelvis is of great value. As the pelvis responds only slightly to chemical stimuli, even 1 per cent. nitrate of silver solutions can be used without causing pain. This injection should be very gently made, for if the pelvis is overdistended one is apt to provoke a severe attack of renal colic.

In cases of urethritis where there is much burning and frequency of urination, we get along better with the urinary sedatives, such as citrate of potash and tincture of hyoscyamus with local applications of argyrol or nitrate of silver. If the cases are of long standing and rebellious to treatment, the passage of graduated sounds is beneficial. In some of the very chronic and severe cases, I believe that vaginal cystotomy, to give the urethra a complete rest for from four to eight weeks, offers our best and speediest method of cure. I have had no success in draining the bladder through the cystotomy opening with a permanent catheter, as the local cystitis that is set up around the flared-out portion of the catheter causes great pain, and the patients have been unable to continue its use.

In the vaccine treatment we have a very valuable aid, especially in the subacute and chronic stages. In many cases where we have been enabled to get to a certain point and no further by other treatment, I have seen most beneficial results from the use of vaccines. Now we use autogenous vaccines in all colon infections, no matter what part of the urinary tract is involved, in addition to other methods of treatment.

375 WEST END AVENUE.

COLON BACILLUS INFECTION OF UTERUS, TUBES AND OVARIES.*

BY

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(With report of cases from the service of Dr. H. C. Coe, Bellevue Hospital.)

UNDER normal conditions the uterus, tubes and ovaries are free from all forms of microorganisms.

The healthy vagina has few pathogenic organisms. This is borne out by the observations of Krönig, Menge, and Whitridge Williams,

* Read at a meeting of the New York Obstetrical Society, December 9, 1913.

all of whom agree that pathogenic organisms cannot long exist in a healthy vagina. Whitridge Williams, in a study of ninety-two pregnant women, found ninety free from such organisms.

In our practice, however, we are not usually dealing with normal conditions in patients. The abortion case, usually induced and often curetted before it reaches us; the puerperal patient, or the one having chronic disease of the tubes and ovaries, all have some surface open to infection. Moreover, the condition of the intestinal tract is of importance. Any break in the continuity of the epithelial surface opens up avenues of escape into the system for the colon bacillus. This is also true of the gall-bladder and its ducts. It is stated that 80 per cent. of extirpated gall-bladders show the presence of colon bacillus.

During the past three years, thirty-four cases of colon bacillus infection have been found in the service of Dr. H. C. Coe at Bellevue Hospital, and the cases considered in this paper will be taken from this number.

Ten of these cases had pyelitis or cystitis alone, unassociated with pregnancy or operative work. Most of these cases responded readily to the usual treatment with urotropin and soda benzoate, and a buttermilk diet. One was improved by high colon irrigations only. Four of the ten patients had no fever.

Puerperal Cases.—Thirteen of the thirty-four cases had conditions associated with pregnancy or the puerperium. Three of the thirteen were insane and of these three one was taken home unimproved at the end of a week, one (an incurable) was sent to Manhattan State Hospital at Central Islip, where she gave birth to a healthy child six months later, and the third case died in the ward, having developed bronchopneumonia as a complication. She had been transferred to our service from the insane pavillion. One of the thirteen was delivered because of eclampsia, one had a laparotomy for cyst of the ovary infected with colon bacillus, one died of colon bacillus infection of the blood.

Some of the typical histories in this group are as follows:

Miss M. H., Ireland, domestic. Admitted February 25, 1910. Discharged May 21, 1910. Last menstruation six months before. Developed eclamptic convulsion on February 25; Dr. Studdiford did a Dührssen's incision. Child delivered by version. Blood pressure 150-220 mm. Albumin and casts in urine. Blood count March 1, leukocytes 16,200; polymorphonuclears, 89 per cent.; lymphocytes 9 per cent. March 17, three weeks after operation, urine showed colon bacillus in pure culture. Albumin was present at time of discharge.

Miss M. M., aged nineteen, single, United States, bookkeeper. Admitted November 4, 1909. Discharged January 9, 1910. History: Had been delivered at full term of a child at 2.30 A. M., November 4, after two days' labor. Delivery of child and placenta normal. Temperature 100; pulse, 100; respiration 20; on admission and for three days after; leukocytes 22,000; polymorphonuclears 92 per cent. Second day chilly with general pain through body. Third day temperature went suddenly to 105° and lochia became foul. On the third day, with sponge holder and dull curet, much foul placental tissue was removed and an alcohol irrigation given. Second day after this another alcohol intrauterine irrigation given. Following two days temperature went from 102° to 105° and gradually dropped to 98.8°, remaining between 98.8° and 102° until November 17, when it again rose to 105°. On the 18th it was 100° at noon, 102° at night. On the 19th, 105° at night. Patient was abed and fairly comfortable till November 26, when she began to have pain in region of left kidney. November 29, a catheterized specimen of urine showed albumin, pus cells, motile bacteria, and the culture colon bacillus. Patient given urotropin grs. vii, salol gr. v. She was out of bed, December 22. December 16, left inguinal glands were painful. December 27, left leg painful and swollen and tender along course of vein. On December 28, tenderness over kidney had disappeared. Diet of buttermilk. No catheterizing done except for laboratory purposes.

Miss S. S., aged twenty. Admitted October 11, 1911. She had given birth to a child August 10, 1911, in another hospital, after labor induced by bags and completed by forceps. The torn perineum was repaired and patient kept in bed eighteen days, going home the twentieth day. She was ill and weak and returned to same hospital where some operation, probably a curettage, was done. She returned home a week later. Following this she had fever, chills, and sweating every day till admitted to Bellevue. On admission had a temperature of 104°. October 13, uterine culture was negative, urine culture positive colon bacillus. December 9, urine sterile. Treatment: urotropin and high colon irrigations. Temperature returned to normal in five days. Urine cloudy, alkaline, trace of albumin and pus cells. Had an infection of left wrist which was incised and pus released. This was not examined for colon bacillus. Discharged, cured, December 31.

Mrs. M. B., aged twenty-five. Admitted September 2, 1911. Patient gave history of an abortion, induced, at two months. Was curetted day after admission. Pathological report: streptococci, staphylococci and colon bacillus in scrapings from uterus. This was the only case in this series which showed the colon bacillus in the uterus.

M. M. Admitted November 20, 1912. Pregnant four and a half months. For three months pain in right side. Chills, distended abdomen, very ill. Admitted as an appendicitis case. Urine showed colon bacillus and the diagnosis was pyelitis. Treatment: high colon irrigations, and urotropin with soda benzoate. Temperature normal in four days. Discharged cured.

Operative Cases.—A third group of five cases was operated on which had colon bacilli in the urine. In most of these the bacillus was present at the time of operation, or found within a few days. In one case, three weeks after operation the colon bacillus was found in urine and was probably a postoperative infection.

Miss L. T., aged eighteen, United States, housework. Admitted April 2, 1912. Discharged April 21, 1912. Menses always irregular, three to four days. Last menstruation March 24. Three days before admission had pain in lower abdomen at first localized on right side, but later spreading over abdomen, stabbing in character and more intense when lying on side. Constipated since beginning of attack. For two days had been unable to stand because of pain. No vomiting. Examination showed hymen lacerated and a yellow discharge from eroded os. Cervical smear was negative to gonococci. Blood count, leukocytes 21,600; polymorphonuclears 93 per cent. Operation April 2, 1912 (Dr. Studdiford). Right salpingectomy for pyosalpinx. Appendectomy. On left side horn of uterus extended out about 2 inches; left tube, round ligament, and uteroovarian ligament, originating at this point.

April 2, 1912, colon bacillus in culture of urine. April 12, urine sterile.

Report on tube and appendix: acute exudative inflammation. A few pus cells in smear. Culture from tube sterile.

April 15, there was a sudden rise in temperature. Abdominal wound broke down; no colon bacillus found in this pus.

Cystoscopic examination April 26, negative.

Mrs. A. D., aged twenty-four, married. Admitted April 5, 1912. Discharged May 4, 1912. Patient had suffered from chronic suppurative salpingitis. Blood; leukocytes 21,000; polymorphonuclears 89 per cent. Operated on by the writer April 24. Panhysterectomy. Examination showed no organisms in tubes. April 26, urine showed colon bacillus.

Miss B. S., aged eighteen. Admitted June 7, 1911. Discharged June 26. Patient had suffered with pain in right side and on examination by vagina, a large tube was evident. Operation (Dr. Studdiford), June 9, 1911. Dilatation and curettage. Laparotomy; right salpingo-oophorectomy. Colon bacillus in urine.

Mrs. B. K., aged forty-eight. Admitted June 16, 1913. Patient had cystocele and prolapse of the uterus. Had menopause three years before. Operation (Dr. Studdiford). Interposition and perineorrhaphy. Colon bacillus in urine two days after operation.

COLON INFECTION IN CYSTS OF OVARY.

Cysts of the ovary are prone to infection, and this is especially noticeable following pregnancy. Because of the relation of the enlarged ovary to the intestine and the tendency to adhesions between them, infection of an ovarian cyst with bacillus coli is not

uncommon. The traumatism to the ovary in delivery at term, or in operations on the uterus, opens up channels for infection with colon bacillus. One such case was treated by laparotomy. Two other cases were treated by vaginal section.

Mrs. A. B., Hungarian, was admitted to the Maternity Department. She had not menstruated for four months and was having cramp-like pains and some bleeding. Examination under ether showed vesicular mass presenting at os. The os was dilated with bags and manually, and she was delivered of a hydatidiform mole. Surface of uterus was curetted. A mass could be felt at right of uterus. On recovery patient was transferred to Ward 21 and operated on by Dr. Studdiford. Curettage negative. Laparotomy done and uterus found slightly enlarged, wall contained white fibrinous nodules, one of which was excised for diagnosis. Left tube and ovary normal. Right ovary was cystic and size of a lemon. This was excised with tube.

Pathological report: cyst contains pus cells and colon bacilli. Tube normal. Nodule probably fibroid.

The tendency to formation of lutein cysts of ovaries in hydatidiform mole cases has been noted by many writers.

Miss M. P., aged eighteen, seamstress. Admitted April 29, 1911, with temperature 103.4° , pulse, 120 respirations 32. For two weeks had felt indisposed; no definite symptoms, but tired easily on exertion. Two days before admission she had a sudden sharp pain in the median line in abdomen, which persisted and patient was taken to hospital. Blood count day of admission; leukocytes 24,600; polymorphonuclears 79 per cent.; lymphocytes 18 per cent. Operated on day of admission by Dr. Studdiford; posterior colpotomy; sac at right ruptured, then one at left ruptured. Six ounces of foul-smelling material removed. Pathological report: specimen is fat, not pus, and shows colon bacilli. Urine negative. Discharged cured in fifteen days.

Mrs. K. S., aged forty-eight. Admitted May 12, 1911. Discharged May 28. Menses ceased three years ago. In January noticed constant pain in region of perineum, increased on defecation, and this pain had been continuous to date of admission. Micturition occurred with increasing frequency, was painful and urine scanty. She vomited in the morning greenish material, was very weak and had lost 40 pounds. Brought in an ambulance because of pain and vomiting. May 13, blood count; leukocytes 33,200; polymorphonuclears 94 per cent.; lymphocytes 5. Was operated on May 17, by Dr. Studdiford. A posterior colpotomy liberated a considerable amount of foul-smelling pus. A large mass could be felt behind uterus which was diagnosed as ovarian cyst. This was ruptured and discharged a similar material. Smear and culture of fluid from cyst showed colon bacilli. Urine showed pure culture colon bacilli. Scrapings from uterus showed tubercular endometritis. Urotropin was begun May 20. Temperature was 99° to 102° for ten days after the operation.

INFECTION OF FALLOPIAN TUBE.

Infection of the tube by colon bacillus would be expected because of the possible modes of infection: by way of the uterus, by adhesions to intestines, ovary or peritoneum, rarely by way of the lymph stream. Not a large number of tube infections have been reported, however. Up to 1904 but eighteen cases were reported in literature, according to Dr. Frank T. Andrews. Wertheim reported 116 cases of pyosalpinx with no bacillus coli infection. Howard Kelly reported forty-three cases with no bacillus coli infection. A. Martin reported 2098 cases of purulent salpingitis with no bacillus colon infection. Proschner reports on forty specimens of tubes operated on after acute attack had subsided. Thirty-eight were sterile; one was infected by colon bacilli, one by staphylococcus albus.

The custom of waiting for the subsidence of acute inflammation of the tube before operating may be the reason for this. Even when infection of the tube has taken place, the pus may become sterile before operation.

Mrs. M. D., aged twenty-one, domestic. This woman was married ten weeks before admission; miscarriage five years before when three months pregnant. Menstruation had been painful, and last menstruated December 28. On February 7, was suddenly seized by severe cramp-like pains in left iliac region, and at about same time noticed a yellow vaginal discharge and burning on urination. Pain continued and on February 9, she went to bed and began to flow. Finally pain and tenderness led her to enter hospital. Her temperature then was 101° ; pulse 100; respiration 24. Examination showed abdomen slightly distended and tympanitic, with marked tenderness over left iliac and lumbar region. Vaginal and rectal examination disclosed a mass in left side. Blood, 45 per cent. hemoglobin; red cells 3,750,000; leukocytes 14,000; polymorphonuclears 91 per cent.; lymphocytes, 6 per cent.; transition cells 2 per cent. Urine negative.

Operation by Dr. H. C. Coe, February 13. Posterior colpotomy, finger pushed into pus sac and 3 ounces of pus released. No offensive odor. Laparotomy: adhesions binding uterus and tubes broken up. Double pyosalpinx present, the left tube having been ruptured by colpotomy incision. Left salpingo-oophorectomy, right salpingectomy and appendectomy done. Vaginal drainage. Gauze removed fourth day; sutures removed sixth day. Stitch abscess followed.

Pathology: smear taken February 13, from vagina and urethra showed no gonococci. February 13, bacillus coli in cultures from tube. February 19, culture from stitch abscess showed streptococcus and staphylococcus pyogenes aureus. Temperature before operation was 102° to normal; after operation 101.5° and up and down one degree daily for six days.

PELVIC ABSCESS CASES.

Pelvic abscess cases follow an acute inflammatory process resulting in pus formation. The convalescence in many of these cases is tedious, some cases being in the ward ninety days. The four cases reported below with colon bacillus in the pus, are from a total of twenty-six cases operated on for pelvic abscess.

J. N., widow, Hungarian, aged thirty-eight, housework. Admitted December 16, 1910. Discharged March 22, 1911. Menses regular, profuse, lasting six days. Had chronic constipation, nausea continuous for six weeks. For two weeks pain on urination. Two weeks before admission curetted by doctor at home. A mass was noticed in right side of abdomen. On examination in the ward, a mass could be felt in the culdesac, extending up right side. Operation by Dr. Studdiford, December 21. Posterior colpotomy. On breaking into sac with the finger 10 ounces of foul-smelling pus were released and T-tube inserted. Pathology: February 6, leukocytes 21,600; polymorphonuclears 82 per cent.; lymphocytes 18 per cent. February 8, leukocytes 11,200; polymorphonuclears 82 per cent.; lymphocytes 18 per cent. Colon bacilli in pus from abscess. Temperature before operation, 100° to 103°; after operation 100° to 103°; forty-fourth day, 104°. Normal sixtieth day to ninetieth day, when patient went home. Salol was used in this case.

Mrs. A. F., aged thirty-two. Admitted May 22, 1913. Discharged June 15, 1913. When two months pregnant put a button-hook into uterus and twisted it around, then took a carbolic douche. Three weeks later began to flow and called a doctor who curetted her. Began after this to have pain and abdominal distention. When admitted, the blood count was as follows: leukocytes 18,400; polymorphonuclears 86 per cent. Dr. Studdiford curetted her lightly and packed uterus with iodine gauze. Posterior colpotomy done and thick, foul-smelling pus came out. Colon bacilli in culture from pus. Patient suffered much abdominal pain afterward.

Miss J. S., aged twenty-two. Admitted November 20, 1912. Discharged January 4, 1913. Acute inflammatory symptoms; had a miscarriage eight months previously. Posterior colpotomy released thin foul-smelling pus which, on examination showed colon bacilli and streptococci.

A. R. Admitted March 23, 1912. Posterior colpotomy for pelvic abscess. Colon bacillus found in pus.

COLON INFECTION OF THE BLOOD.

Mrs. A. W., aged thirty, married. Russian. Admitted August 29, 1913. Patient could not speak English and no interpreter could be found. On admission, temperature 97°; pulse 84. General appearance was bad. Had hectic flush, dry and cracked

lips, sordes on teeth, dry tongue, distended abdomen. Had the general appearance of a typhoid patient, but no fever. Uterus was well contracted, os small but eroded, adnexa negative. No odor to vaginal discharge. Widal test was negative. No indication for operation. A rash appeared third day. Wassermann test was positive. A blood culture was made September 4 (three days before death), and reported to be a pure culture colon bacillus. This report was not received till about the time of death.

Blood count on admission: leukocytes 10,200, polymorphonuclears 76 per cent., lymphocytes 8 per cent. On sixth day (after blood was taken which showed colon present): leukocytes 36,000; polymorphonuclears 86 per cent., lymphocytes 6 per cent., transitionals 8 per cent. Ninth day leukocytes 39,200, polymorphonuclears 88 per cent., lymphocytes 4 per cent. Urine 1020, small amount of albumin, not examined for colon bacillus. Cervical smear negative to gonococcus.

The patient was restless and irrational, abdominal pain and vomiting continued; medication not retained well; continued getting weaker till death.

About time of death husband appeared and stated that she had been delivered of a six and a half months child six weeks before by some operative procedure, and that she had pains in abdomen; vomiting and high fever, beginning a few days after delivery.

In this case the colon bacillus found in the blood taken three days before death, shows a true colon infection of blood as cause of death. The temperature chart shows no fever for five days, and then only to 101.5°; chills and high fever usual in such cases were not present.

We must bear in mind that pathogenic organisms do circulate in the blood during life in small numbers without serious results. Also that at death or a few hours before death the resistance of the intestinal wall is lessened and the organisms may pass into the system.

In this country but few cases of colon bacillus in the blood have been reported although many cases are noted in the foreign literature in the last two years and about seventy cases are on record.

Jacobs, in 1909, collected twenty-six cases from the literature and added thirteen of his own, making a total of thirty-nine. Nine of Jacobs' cases recovered and four died. Jacobs states that death occurs in 40 per cent. of the cases.

P. M. Ponton and H. L. Tidy, London, report three cases of colon infection of blood. One of these was a woman in puerperium. This patient was treated by autogenous vaccine of bacillus coli and made a complete recovery.

Dr. Warren Coleman and Dr. T. W. Hastings have reported from the medical service of Bellevue Hospital, four cases of colon

infection of the blood and called attention to the great resemblance of these cases to typhoid in their clinical manifestations.

Dr. George Draper reported a case of colon infection in the blood, in a patient with intrahepatic calculi and referred to a case of Dr. Wilson's in the Pennsylvania Hospital, in which the blood was taken eighteen hours before death.

Blackender and Gillies report a colon infection of the blood in an abortion case, in which the blood was taken eighteen hours before death.

Siredy and Bodin report a case simulating typhoid in which they recovered the organism from the blood thirty-six hours before death.

Dr. M. Semon examined the blood of eighty-six puerperal cases; three contained colon bacillus in the blood and all three recovered. All had colon bacilli in the urine.

Dr. Otto Brian reported seven cases of colon infection of the blood, all of which were mild cases and recovered. The sources of the infection were: from the bile passages to the blood, from typhoid ulcers, from intestines in chronic dyspepsia and traumatism of external genitals.

F. Widal Bernard reports two cases of bacteremia of colon origin in pregnant women with pyelonephritis, all recovered; colon bacilli being present in the urine.

SUMMARY OF CASES.

Ten cystitis or pyelitis cases with colon in urine. No operation.

Thirteen puerperal cases, including eleven with colon bacilli in urine; one, colon infection in the blood; one, cyst of ovary infected with colon bacillus.

Three laparotomy cases with colon in urine.

One pus tube infected with colon bacillus.

One interposition operation with colon in urine.

Six posterior colpotomy cases for pelvic or ovarian abscess with colon bacillus in the pus.

In these colon infections the following symptoms are usually noted: high fever, abdominal pains, localized according to the seat of infection, though sometimes general; chills followed by exacerbations of fever; nausea and vomiting. The leukocyte count is usually high, and the polymorphonuclear count above 80 per cent. and in many cases 90 to 96 per cent. Urine is, as a rule, cloudy, acid, free from albumin. In five cases urine was alkaline and six had a trace of albumin; one a large amount of albumin with casts. Five had a few pus cells. Some cases present only a few of these

symptoms and seem not very sick. Some leave the hospital improved or cured in a few days; others having had complicating puerperal infection, or long-continued colon infection without treatment, take weeks or months to be restored to a fair degree of health.

Klecki has pointed out that the colon bacillus in the intestines varies in its virulence. The ileum harbors the most virulent type; jejunum next, and the colon least virulent.

This perhaps explains the lack of severe symptoms in some cases, and the severity in others.

Treatment.—In the treatment of these cases in Dr. Coe's service, operations have been performed as indicated, but none were done for pyelitis. Colon infection of urine was treated with hexamethylamin and sodium benzoate, and in nearly all cases high colon irrigations have been of much benefit. In cases of vomiting gastric lavage was done. A buttermilk diet was the rule. In our service the vaccine has not been used. We will leave the discussion of its use to those who have had experience in its application. We believe some cases recover spontaneously and others when the exciting cause is removed, as in pregnancy and intestinal diseases.

In reading of these colon bacillus cases in the *London Lancet*, it is noted that the profession in England believe that the growth of the colon bacillus is favored by acid urine; and they use potassium citrate with hexamethylamin to make the urine alkaline.

We have seen in the cases reported some mistakes in diagnosis. Some are sent in with a tentative diagnosis of appendicitis when the real trouble is colon pyelitis of right kidney; others as puerperal sepsis when the infection is colon bacillus in kidney or bladder; some as acute salpingitis, some as typhoid fever. Most of these have been discovered before reaching the operative stage.

WHAT IS THE LESSON FROM A STUDY OF THESE CASES?

To the men in this service it seems that the gonococcus, the streptococcus and the staphylococcus are not the only organisms to look for, when fever is present, in a gynecological or obstetrical patient. Thirty-four colon bacillus cases in three years in a service of twenty-five beds shows that the colon bacillus is a factor to be reckoned with.

We believe a culture of the urine should be made in all suspicious cases, and that a culture from the uterus should be made in all supposedly septic cases.

In our own service we have gone beyond that, and now standing orders in the ward are to take a culture of the urine in all cases.

By cooperation between the pathological department and the ward service, insuring promptness in reporting the results of examinations, much help will be given and some mistakes avoided.

REFERENCES.

- Frank T. Andrews. *AMER. JOUR. OBST.*, vol. xlix, p. 177.
 Proscher. *Transactions American Gynecological Society*, 1904, vol. xxxiv, p. 171.
 L. Jacobs. 1909, *Deutsch. Arch. f. klin. Med.*, vol. xcvi, p. 303.
 Dr. George Draper. *Bulletin Ayer Clinic*, Pennsylvania Hospital, Philadelphia, No. 6, p. 21.
 Blackender and Gillies. *Transactions of Association of American Physicians*, 1906, vol. xxi, p. 268.
 Sirey and Bodin. *Med. des Hospital*, 1905, 3 S. 12, p. 392.
 Dr. M. Semon. *Monatschr. f. Geb. u. Gyn.*, 1911, vol. xxxiii, pp. 148-161.
 Dr. Otto Brian. *Deutsch. Arch. f. klin. Med.*, 1912, 106, pp. 379-399.
 F. Vidal Bernard. *Journal Urology, Medicine and Surgery*, Paris, March, 1912.
 P. M. Ponton and H. L. Tidy. *London Lancet*, November 30, 1912.
 Dr. Warren Coleman and T. W. Hastings. *Bulletin of Bellevue Hospital*.
 121 WEST SEVENTY-THIRD STREET.

NOTE ON DETERMINATION OF PATENCY OF FALLOPIAN TUBES BY THE USE OF COLLARGOL AND X-RAY SHADOW.*

BY

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IN studying the problem of sterility, I am, in certain cases, attempting to demonstrate the patency of the Fallopian tubes by x-ray examination of the distribution of collargol after injection through the uterus and tubes. The principle is simple. If the tube be patent the shadow extends throughout its length and irregularly into the lateral pelvis. The obstructed tube shows a shortened shadow.

Mrs. B. entered Brooklyn Hospital for operation January 5 of this year. Indication for operation was recent continuous pelvic pain. Two years ago I did a Webster-Baldy shortening of the round ligaments for retroversion. Examination on admission showed uterus

* Read before the Brooklyn Gynecological Society, Feb. 6, 1914.

movable and in position. There was tenderness in each fornix. No mass was palpable. Patient neurotic and fearful of pregnancy. For the purpose of demonstration, 10 c.c. of collargol solution was injected through the cervix while the patient was under anesthetic before laparotomy. When the abdomen was opened, the silver solution was seen exuding from the right tube. There was no flow through the left tube. As a part of the operative procedure the left tube was removed. Although when freed from adhesions it seemed normal, careful examination showed it to be occluded $1/2$ inch from the uterine end. The skiagram had extended to this point. The patient made a prompt and comfortable convalescence.

In taking up the question of sterility in the individual case we can seldom feel that our diagnosis is accurate or any prognosis warranted because of our inability to determine if the tubes are unobstructed. An occasional case presents a history of tubal infection with signs of diseased adnexa so evident that a temporary unfavorable prognosis is warranted. Other frank lesions may be present which prevent fertility. More frequently, however, we are consulted by the patient who has no reason to suspect pelvic disease and in whom we find no gross lesion. In these cases a careful detailed history including an inquiry regarding sexual hygiene and compatability is indispensable. The routine study includes an examination of the vaginal and cervical secretions. We must note whether the cervical canal is obstructed by tenacious mucous or angulation, or if the secretion is destructive to the spermatozoa because of infection. Does the history indicate a condition of the endometrium unfavorable to pregnancy? Our data are only half complete without a detailed microscopical examination of the semen, which involves an estimation of the relative number of spermatozoa and the relative degree and length of activity and also the percentage of deformed and immature cells. These questions I have discussed in a previous paper. (*Internat. Jour. of Surg.*, May, 1912, p. 140.)

If in this large group of causes of sterility we can now bring to bear definite knowledge regarding the patency of the tubes, the most important single factor is determinable so far as the woman is concerned. An intelligent prognosis may be given. In this matter one draws attention to the frequency with which, when operating, we find clubbed tubes in the absence of any definite history of salpingitis. No doubt a proportion of our 70 per cent. of failures in treating sterility is due to this condition. With the patency or blockade of the tubes known we may avoid useless local treatment and operations on the uterine cavity or canal. The indications for artificial impregnation or conservative operation by laparotomy

may be more clearly defined and the probable importance of minor abnormalities determined.

To carry out this method the patient must be in the dorsal position upon the plate with the apparatus in position to take the picture immediately after the injection of the collargol. A speculum and tenaculum to expose and steady the cervix are required. For injection, the Skene glass intrauterine instillation tube with the Dickinson modification of the curve is used. The rubber bulb should have a capacity of 10 c.c. Two sizes may be at hand. The internal os must be passed but is to be snugly fitted by the tube. After sterilization of the instruments, the cervix is exposed and wiped with iodine. The silver solution is then slowly injected after entrance of the pipet directly into the body of the uterus. The cavity of the uterus holds 8 minims as a rule. (Veit's Handbuch, Endometritis.) If uterine colic occurs, one waits. After injection the picture is made.

This procedure will not be safe if infection in any form exists. It is therefore contraindicated if the history indicates a recent pelvic inflammation. Theoretically it will be unsafe indefinitely in those cases where we wish to note the condition of the tubes after postabortal infection. After three months of freedom from acute gonorrheal inflammations or the class of cases where the colon bacillus, typhoid, or other simple catarrhal inflammations have occurred we do not expect reaction. (Bacteriology of Periuterine Suppurations. Hartman and Morax V. Gaz. Med. de Paris, 19 No. 12, March 24, 1894.) Cases with very little or no history of pelvic disease are our hardest problems and in this group the method is applicable. Retrodisplacement of the uterus, prolapse of the adnexa or both may cloud the picture. This may be corrected by reposition and insertion of a pessary before the injection is made. Whether the silver salts thus used have any desired therapeutic action we are not ready to state. I hope to make a more complete study with report of cases later.

CONTRIBUTION TO THE TECHNIC OF PERFORATION.*

BY

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New York City.

(With three illustrations.)

THERE are many instruments devised for perforating the fetal skull in craniotomy operations, but the most popular one is the Smellie scissors, an instrument having cutting edges on the outer edges of the ends of the blades.

Many of the other instruments are merely modifications of this device made with the object of protecting or covering the cutting

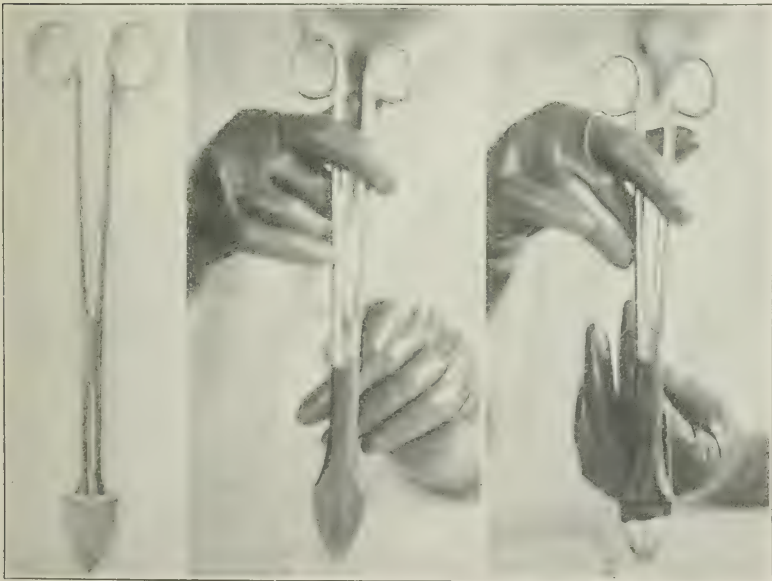


FIG. 1.

edges during insertion. Everyone who has performed the operation of craniotomy with the fetal head unengaged or at the brim of the pelvis will realize the practical advantage of having the cutting edges

* Presented at a Meeting of the New York Obstetrical Society, December, 1913.

so covered that they will neither injure the patient nor the operator. In order to gain such protection when using the Smellie perforator it is only necessary to place over the triangular end of the instrument a rubber finger cot of good quality or a finger of a rubber glove either of which is ordinarily on hand and may be boiled in the usual way. If the finger cot fits loosely over the end of the scissors, the instrument may be inserted with as little danger of damage as would occur with any blunt instrument.

After the perforator is adjusted at the desired point on the fetal head, the unengaged hand grasps the finger cot or glove finger and puts the rubber on the stretch, then the point of the instrument is forced into the skull and the rubber is cut through by the pressure against the sharp blades. If this does not occur at once, opening the scissors to a slight extent will cause it to occur. The rubber is then drawn up the handle and slipped over the end or else allowed to remain.

The pictures show the proceeding correctly with the exception of the hands of the operator, which were placed behind the instrument so as not to obscure the illustration.

It is my belief that this simple addition to the technic will render a disagreeable operation a little easier of accomplishment.

269 LEXINGTON AVENUE.

A NEW FORM OF OBSTETRICAL TABLE.

BY

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(With two illustrations.)

THE table, 72 inches long and 28 inches wide, is made in two parts, the upper part measuring 39 inches and the lower 33 inches in length. In case of applying forceps or repairing an extensive perineal laceration, instead of the patient being pulled down to the foot of the table as is usually done, the lower part is detached and the patient is in a position for the operation without being in the least disturbed.

Photograph No. 1 shows the entire table.

Photograph No. 2 shows the table in two parts, the upper part is raised, the stirrups are in position and the lower part is standing at the right.

This table is now being used at the Montefiore Hospital and also at the Elizabeth Steel Magee Hospital of Pittsburgh.

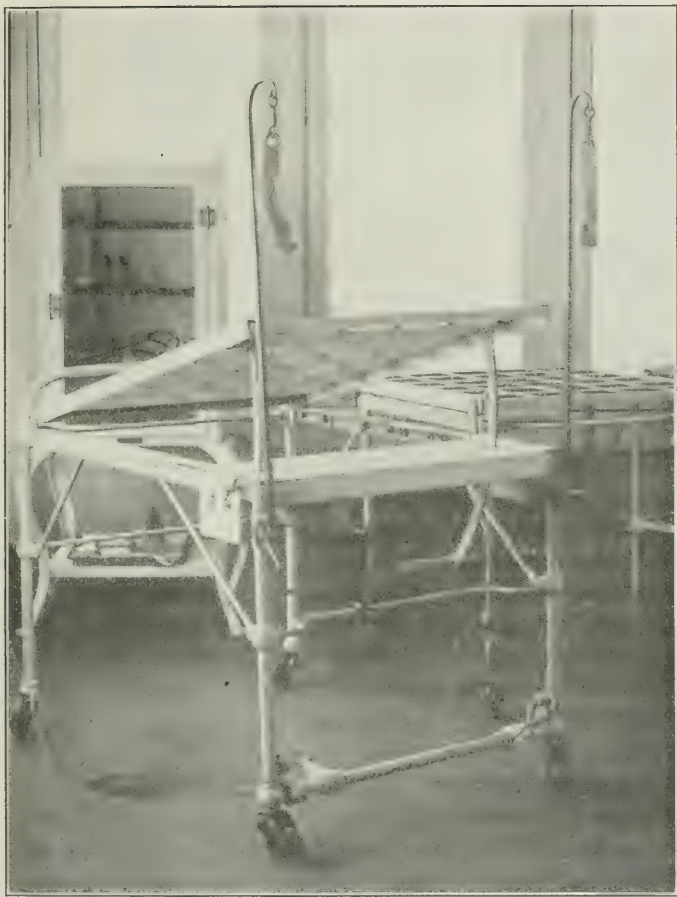


FIG. 1.—Hospital bed for operative obstetrics.

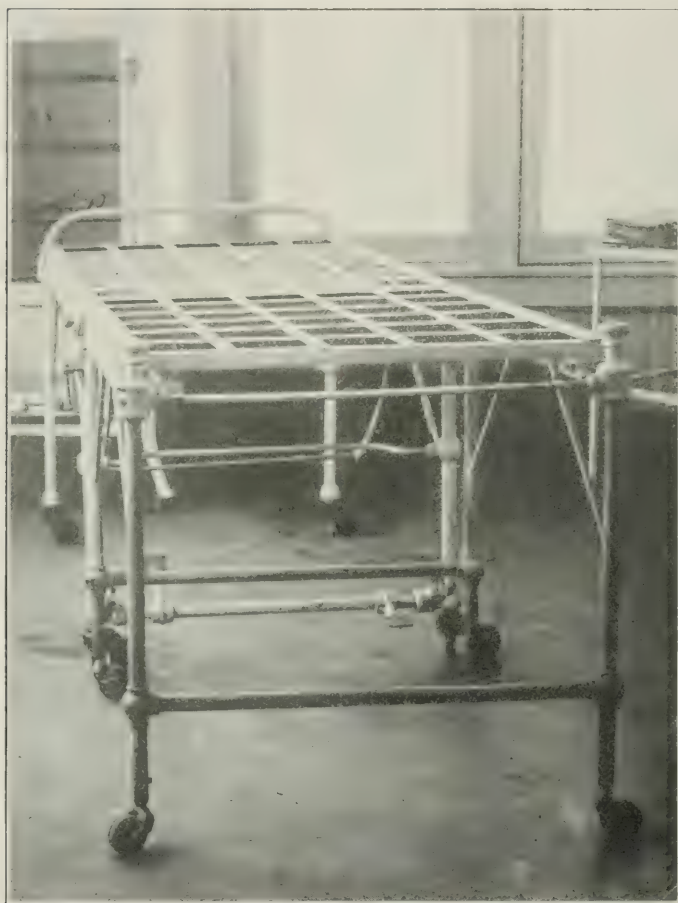


FIG. 2.

THE PRESENT STATUS OF FIBROIDS OF THE UTERUS.*

BY

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THE terms myofibromata, fibromyomata, myomata and fibromata are used interchangeably. The proportionate amount of muscular and fibrous structures varies to such an extent under differing conditions in the same tumor, and in separate tumors in the same uterus, that it is difficult to classify them under any one of the above heads. These terms are therefore by common use applied interchangeably, and refer to the same kind of growth.

Fibroid tumors of the uterus are found at any age, from three to eighty years or over. Pfannenstiel successfully removed a large fibroid tumor from a Russian woman in her eighty-third year.

McDonald's statistics show the greatest number came for operative treatment between the ages of forty and fifty; a less number between thirty and forty, and still less between twenty and thirty. Out of 500 cases operated less than 3 per cent. were under thirty years of age.

Stone reports 166 cases, all operated on in the same hospital. The greatest number, sixty-seven cases, were between the ages of forty and fifty; sixty-two were between thirty and forty, and twenty-two under thirty.

Miller reported 299 cases, of which number 120 were discovered during the forty-fifth year of life.

It is estimated that 10 per cent. of all women have fibroid tumors of the uterus at the age of fifty years. They occur more frequently in the negro, and at an earlier period of life, than in the white woman.

It is generally believed that fibroid tumors of the uterus occur more frequently in married than in single women. Is this really the case? When we remember that fibroid tumors are more frequently found between the ages of thirty and fifty, past the age when most women marry, the question arises were there not small, symptomless tumors present before marriage. Then, too, there is such a small percentage of women remaining single up to the age of fifty that the number of fibroids of the uterus found would necessarily

*Read before The North Shore Branch, Chicago Medical Society, Dec. 2, 1913.

be less than in married women. In fact some claim a greater percentage in single women.

Sampson made a study of the blood supply of 100 myomatous uteri removed at operation. In one-half the cases gelatine mass containing bismuth was injected; the others were injected with gelatine containing Venetian red for the arterial system, and ultramarine blue for the venous.

He demonstrated an arterial blood supply, which varied greatly in different specimens. In large myomata the uterine blood-vessels were frequently found to be increased in size, and apparently in numbers.

Specimens injected frequently showed a proliferation of the intrinsic vessels, so that the tumor was much more vascular than the uterine wall. There was no definite arrangement of the blood-vessels of the tumor growth, which was so characteristic in the normal myometrium. Specimens from old women were found to have a less rich blood supply than those obtained from younger women.

There were present in many of the vascular tumors arterial trees, each complete in itself, with roots, trunk and branches, the latter communicating with the roots and branches of other arterial trees. This arrangement was in some cases so extensive that the x-ray picture suggested an arterial angioma rather than a myoma.

The author was unable to demonstrate a venous system in the tumor, and the question of how the blood gets out of the tumor could not be answered; but he attributed this failure to technical difficulties, and believes there must be some transference of blood from the arterial to the venous system in the body of the tumor. He suggested the possibility of blood both entering and leaving by the arteries, joining veins outside the tumor.

A very interesting fact was brought out in this paper, that during the injection he never saw any of the injecting fluid escape from the uterine cavity unless the patient had been actually bleeding at the time of the operation, or unless the uterus had been removed during menstruation. In the latter case the venous injection fluid mass often escaped from the cervix, but it was not possible to cause artificial menstruation, even by the use of force, unless the uterus was in the menstrual stage. This illustration points out the fact that a good many other factors besides mere pressure are necessary for the production of menstrual bleeding.

The classification based on the position of fibroid tumors in relation to the uterine wall has changed but little since the classical essay by Atlee in 1853. He classifies them as follows:

1. Extrauterine or surface tumors.
2. Intrauterine or cavity tumors.
3. Intramural tumors of the uterus.

All fibroid growths arise in the uterine wall, but probably the subserous and submucous varieties have their origin at the outer or inner surface of the uterine wall, and as they increase in size bulge out or inward as the case may be to become subserous or submucous fibroids.

Degenerations.—Degenerations may be divided into two classes: class (a), degenerations of fibroids themselves, which may be either nonmalignant or malignant; class (b), malignant disease of the body or the cervix of the uterus associated with fibroids of that organ.

Noble in his study of 2274 tumors of the uterus, found degenerations and complications were present in 1553 cases, or a total of 68 per cent. Out of this number there were 655 malignant and non-malignant degenerations, or 42 per cent. Sarcomatous degeneration was present in thirty-four of the 2274 collected cases, or 1.4 per cent.

Tracy analyzed a series of 3561 cases. Out of this number he found degenerations and other changes in 1147. However, he is inclined to the belief that these changes did not occur in 1147 patients, but that the degenerations took place in a definite number of specimens; for it is a well-known fact that a uterine tumor may undergo two or more varieties of degeneration. If each variety is placed in a separate class it is obvious that the number of patients suffering from degenerative changes must be considerably less than the total of the various classes.

In the series of 700 cases reported by McDonald, a routine pathological examination was made, macroscopically and microscopically, of all tumor growths removed. He found hyaline, calcareous, cystic, hemorrhagic, necrotic and adenomyomatous degenerations present in 306 cases, or 43 per cent. Out of the 700 cases there were thirty-five malignant degenerations, of which seven were sarcomatous, or a total malignancy of five per cent. He found associated carcinoma in twenty-eight; twenty were adenocarcinoma and influenced by the presence of the fibroid growth, while eight cases—six squamous carcinoma and two chorioepithelioma malignum—were of accidental association.

He shows that fibroid tumors of the uterus are liable in a large percentage of cases to undergo degenerative changes, the dangers of which are increased by the age of the patient; that the sarcomatous changes, carcinomatous association and other degenerative changes

warrant the removal of fibroid tumors of the uterus when of sufficient size to produce symptoms.

Winter believes that if all myomata were examined systematically sarcomatous degenerations would be found in about 4 per cent. In a series of 253 cases in which sections were taken sarcoma were found in 4.3 per cent.

Martin, Collingworth, Scharlieb, Haultain, McDonald and Hirst, out of a total of 1714 cases, found thirty-eight sarcomatous degenerations, or 2 per cent.

Bland-Sutton holds that fibroid tumors do not undergo sarcomatous degeneration, but believes that tumors reported as fibroids which have undergone sarcomatous degeneration were in all probability sarcomatous from the beginning.

In Deaver's series of 342 cases he found four cases or 1.2 per cent. of sarcoma. In his opinion the sarcomata found were entirely independent of the myomatous growths and were only accidentally associated. He believes that it is possible for myomatous growths to undergo sarcomatous degeneration, but he cannot agree that it occurs as frequently as some authors find it.

ASSOCIATED CARCINOMA.

Deaver reports eleven cases, or 3.1 per cent., of cancer of the uterus as an associated complication of myomata, and believes that there is an increased tendency to develop carcinoma in fibroid tumors of the uterus.

McDonald found associated carcinoma in twenty cases, or 2.8 per cent.

Kelly and Cullen found forty-three carcinoma out of 1400 cases, or 3 per cent.

Noble found 2.8 per cent. of carcinoma out of his 2274 collected cases.

It is variously estimated that the ratio of cervical to corporal cancer ranges from 4 to 1 to 15 to 1. McDonald's statistics show cancer of the body of the uterus present in twenty out of 700 cases and six of the cervix, a ratio of more than three of the fundus to one of the cervix. It is apparent from these and other statistics that cancer complicating fibroid conditions of the uterus is more frequently found in the fundus than in the cervix.

The influence of chronic irritation in producing cancer is hardly to be questioned. The experience of Bloodgood and others verifies the observation that carcinoma rarely develop in the skin, especially in

certain regions, without some preexisting irritative lesion, such as ulcers, moles, senile keratosis, x-ray injury, syphilitic or tubercular traumatism, etc. If this is true of the skin it is reasonable—and as a matter of fact is recognized as true—that injury to concealed epithelial surfaces of the body is a factor in producing malignant growths.

In looking over the literature one cannot help but feel the hand of tradition in the conservative attitude toward the removal of fibroid tumors of the uterus. This conservatism was justified in the pre-aseptic days of surgery. No one can help but feel this who is acquainted with the early literature. But in our day of asepsis, anesthesia and perfected technic, when operations are advised and performed daily for comparatively less important pathological conditions such as adhesions, internal operations for the removal of appendices, displacement of the uterus or ovary, hydrosalpinx of the tubes, etc., this conservative attitude is no longer justified.

It seems to me that not infrequently it is a personal equation with the surgeons as to when operation is or is not indicated.

Of course we all know that what is radical to-day may be conservative to-morrow. The pendulum swings back and forth. Too frequently it is extreme. It is unfortunately true that a physician of prominence may with a clear conscience advocate a theory that, no matter how fallacious, is sure to have its following for a time. Among our prominent men now there are a few who deny the degenerative changes, and minimize the complications in fibroid tumors to such an extent that in their opinion operation is but seldom indicated.

INDICATIONS FOR TREATMENT.

1. It goes without saying that tumors undergoing malignant degeneration, if operable, should be removed.

2. Regardless of malignant degenerations, fibroid tumors should be at once removed when situated in the lower segment of the uterus and causing symptoms, because of the greater difficulty and danger of removal as the tumors grow.

3. Fibroids should be removed when bleeding is profuse and cannot be controlled, as this may lead to chronic anemia, which in turn may cause cardiac and vascular changes; or when of sufficient size to cause pressure symptoms, which may not only do damage to the urinary tract but cause injury to adjacent structures. Furthermore, delay may necessitate operation at a later date under less

favorable conditions. Noble points out that by early operation the mortality rate can be reduced to 1 per cent. or less.

Lizars in 1825, Granville in 1826, and Dieffenbach in 1827, were the first men to perform abdominal section for myomata of the uterus. They did so following a wrong diagnosis, thinking they had to deal with ovarian tumors, and closed the abdomen as soon as they recognized the condition. Atlee in 1844 did a successful abdominal myomectomy. The cases operated on previously ended fatally.

Burnham in 1853 performed a myomectomy with removal of part of the uterus and his patient recovered, though the intestines prolapsed during the operation. Kimball, who had assisted him, operated in the same year and was the first to diagnose and successfully perform a myomectomy.

Ten years then elapsed until Koeberle of Strassburg began extraperitoneal myomectomy in 1863. Four of his nine cases recovered. He was also the first to use iron wire to ligate the pedicle.

In September, 1869, Pean performed his first abdominal myomectomy. In order to minimize the abdominal opening he passed threads through the tumor and amputated it over the point of ligation in morcels (morcellment).

In 1878 Schroeder began the extraperitoneal method of treating the pedicle, using elastic threads for ligating. One year later he began to ligate the arteries supplying the uterus previous to operation.

RESULTS OF ABDOMINAL MYOMECTOMY IN EARLY DAYS.

Koeberle found up to 1864 in the literature fifteen uncompleted and thirty-five completed myomectomies with twenty-five deaths—46 per cent. mortality.

Caternault in his "Essai sur la Gastrotomy," 1866, collected forty-two cases of hysteromyomectomy with thirty-two deaths—76 per cent. mortality.

Routh of London (quoted in Veit's Handbook) collected from the literature up to 1864, thirty-three abdominal myoma operations with twenty-three fatal endings—70 per cent. mortality.

Pozzi in 1875 collected 119 myoma operations with seventy-seven deaths, or a mortality of 64.5 per cent.

How quickly the results of abdominal operation improved can be seen from Gusserow's statistics, according to which up to 1885, nineteen different surgeons operated on 533 cases with 185 deaths, or a mortality of 34.8 per cent.

Since 1885 the mortality has been steadily reduced to less than 1 per cent.

OPERATIVE TREATMENT.

In the case of young women or a married woman desiring offspring, there being no contraindications, myomectomy is the operation of choice. The chief dangers complicating myomectomy are the possibility of infection and the difficulty of obtaining perfect hemostasis. An additional point against the operation of myomectomy is the possibility of overlooking small or latent fibroids, which may require later operation.

Olshausen performed 124 myomectomies, with fourteen deaths and eight recurrences. Bland-Sutton had ninety-five myomectomies with three deaths and ten recurrences. Mayo in his 157 consecutive myomectomies had but one death. He attributes this low mortality in his myomectomies to a suggestion made by Ochsner to tie the sutures only tight enough to coapt the tissue and stop hemorrhage.

Perhaps the strongest reason for performing the conservative operation of myomectomy is to retain the child-bearing function. It is estimated that only about 10 per cent. of the women that have myomectomy performed subsequently bear children. Therefore the question of future child-bearing should not too strongly influence the decision between myomectomy and hysterectomy.

Experience has proven that after the patient has reached the age of forty, or after pregnancy is inadvisable, supravaginal hysterectomy is the operation of choice, giving the best immediate and remote results in the removal of fibroid tumors of the uterus. When complicated by disease of the cervix or malignancy of the uterus or tumor total hysterectomy should be performed.

ROENTGENTHERAPY.

There is so much enthusiasm and interest shown in the many reports on the cures of myomatous uteri by irradiation that we must recognize this method of treatment in at least selected cases. A definite, scientific procedure in Röntgentherapy for myomata which can be applied to all cases does not yet exist. The age, size and site of the tumor, its sensitiveness to the effects of irradiation, as well as the individual sensitiveness of the patient, must be considered.

The general technic as recommended by the various authorities on gynecological Röntgentherapy is as follows:

The patient should be placed in the horizontal though the upright position may be used. The parts of the body which are not to be

irradiated should be protected by lead. Over the regions of the body to be treated aluminium screens must be used to intercept the rays that only affect and injure the skin.

The exposure of the myomatous growth to the rays is usually made abdominally, but may be made through the sacrum. Obviously the rays are less effective from the latter direction. Exposure may be made both through the abdomen and sacrum at the same sitting, especially when quick relief is necessary.

In order to minimize the effect on the skin the exposures are made centrally and obliquely from different positions. The most effective distance of the tube from the skin is estimated to be five times the depth of the part to be treated.

Only hard tubes should be used. The surface dose employed for the cure of myoma or hemorrhage varies according to the case. For urgent cases the tendency is to give a few large doses; for less urgent smaller doses at more frequent intervals.

According to the Hamburg technic irradiation is given on four successive days, then fourteen days intermission, and the same repeated until results have been obtained.

CONTRAINDICATIONS.

Röntgenologists are not fully agreed on the contraindications for röntgentherapy for uterine myomata. However, it is generally acknowledged that pedunculated tumors with or without torsion of the pedicle, cystic, sarcomatous degeneration or carcinomatous association, gangrenous or infected myomata, polypus, inflammatory or suppurative disease of the adnexa contraindicate Röntgentherapy.

Kroenig and Gauss would treat surgically only (1) pedunculated submucous myomata, (2) gangrenous myomata or when gangrene is suspected, (3) myomata which are complicated with carcinoma, (4) sarcomatous degeneration or when suspected on account of rapid growth or severe hemorrhage and when Röntgentherapy failed to relieve it, (5) myomata which have caused acute incarceration of the bladder.

They contend that in all other cases radiotherapy should be regarded as the procedure of choice.

There is a question as to whether or not women who have cardiac disease and are severely anemic from long-continued bleeding should be subjected to Röntgenization because the hemorrhage frequently increases at the beginning of treatment. Menge, Freund, Kroenig, Gauss, Fraenkel, Loose, Bumm, Eymer, Lorey and others take a

position in favor of just these cases of anemia and heart disease; Doederlein and Schoenberg advise against it. Runge advocates Röntgenization in such cases only as a last resort.

Runge, Fiessler and Von Graff hold that women in whom a pregnancy may be yet expected should not undergo Röntgenization because the ova may be damaged or anomalies in development may occur.

REPORTS OF IRRADIATIVE TREATMENT OF MYOMATA OF THE UTERUS.

Toveau de Courinelles found that early fibromata, even though they be of considerable size, respond quickly to external treatment with aluminium filtered Röntgen rays. The first results were cessation of hemorrhage and pain. The effects of the treatment are quicker and more marked the nearer the menopause, even where the fibromata are of long standing.

Pfahler reports sixteen cases that had x-ray treatment, of which thirteen, or 80 per cent., were thoroughly cured. The other three were improved. One of the last on account of a cyst was operated. He found the bleeding was soon checked after treatment, and that the older the patient the more easily the bleeding is controlled. The tumor itself is the last to disappear.

In Cases IV and VII the tumors reached to the navel. In Case IV after two years the tumor was reduced to the size of an orange; in Case VIII after two years the tumor was greatly reduced and after four years no trace of it could be found.

Kohler reports eighty cases of myomata which he treated with x-rays. In fifty of the cases treatment resulted in complete cessation of hemorrhage, while in the other fifty oligomenorrhea resulted. He demonstrated a diminution in the size of the myomata in 30 per cent.

Mohr reports 796 cases of uterine myomata treated with Röntgen rays. At the time of the report there were still under treatment, 60 cases; abandoned treatment uncured, 27 cases; unknown results, 40 cases; total, 127; this leaving 669 cases to be analyzed.

(a) Out of this number there were 376 cures, or 56.2 per cent., affected as follows: (1) Amenorrhea, 365 cases, or 97.1 per cent.; (2) desired oligomenorrhea 3 cases, or 0.8 per cent.; (3) relief from pain, on account of which the treatment was given, 8 cases, or 2 per cent.

(b) Improvement in 120 cases, or 17.9 per cent.: (1) Oligomenorrhea, 45 cases, or 37.5 per cent.; (2) normal menses, 13 cases, or 10.8

per cent.; (3) improvement of hemorrhage, 62 cases or 51.7 per cent.

(c) Cures and improvement in which the author omitted details, 88 cases, or 13.2 per cent.

(d) Not cured, 74 cases, or 11.1 per cent.

(e) Relapses, 7 cases, or 1 per cent.

(f) Fatal, 2 cases, or 0.29 per cent. (due to anemia and dilatation of the heart.)

(g) Treatment insufficient, 2 cases, or 0.29 per cent.

AGE OF PATIENTS

Age	No. patients per cent.	Cured per cent.	Improved per cent.	Not cured per cent.
20-30 years...	0			
30-40 years...	28 or 13.9	13 or 46.4	12 or 42.9	3 or 10.7
40-50 years...	131 or 64.9	106 or 80.9	13 or 10	12 or 9.1
50 and over...	43 or 21.2	40 or 93.8	2 or 4.7	1 or 2.3

SIZE OF TUMORS (INDICATED IN 380 CASES)

Unchanged	Slight decrease per cent.	Considerable decrease per cent.	Completely disappeared per cent.
81 or 21.3	219 or 56.6	52 or 13.7	20 or 5.3

Subjective sensation that the abdomen had become smaller.	3 or 0.8 per cent.
Tumors increased in size.....	5 or 1.3 " "
Severe hemorrhage at the beginning of treatment of 669 cases.	23 or 3.4 " "

SUMMARY.

If these and other favorable reports on the cures of myomata with Röntgen rays should be sustained by future developments, then irradiation would supplant surgery in many cases. However, unfavorable results are steadily being reported which tends to modify the enthusiasm for this method of treatment. Moreover, a close examination of the reports of cures by irradiation shows that only a very small percentage can be classified as complete cures.

Mohr's report of 796 collected cases, in 380 of which the size of the tumor was indicated, showed disappearance of the tumor in only twenty cases, or 5.3 per cent.

The majority of so-called cures are only cessation of symptoms, such as affected amenorrhea, oligomenorrhea, and relief from pain.

The danger of late appearing lesions, which time alone can teach, is another possibility not to be overlooked.

Another factor against the use of Röntgen rays, especially in young women, is the damage done the ovaries. Kohler has shown that even small doses permanently injure the ovarian follicles. It is claimed by some that the effect is primarily on the ovaries, and the effect on the tumor secondary. Findley suggests that when the ovaries lie behind large tumors no results are obtained by Röntgenization.

Furthermore, the splendid results following hysterectomy and myomectomy in the hands of competent gynecologists, the possibility of properly treating other structures that may be involved at the time of operation, and the conservation instead of the destruction of the ovaries, are strong factors for removal and against irradiation treatment.

BIBLIOGRAPHY.

- Atlee. Transact. Am. Med. Assn., 1853, vi, 547.
 Bland-Sutton. Fibroids of the Uterus, 1913, AMER. JOUR. OBST., 1911, vol. lxiii.
 Bloodgood. *J. Am. Med. Assn.*, Oct. 29, 1910; Nov. 3, 1910.
 Toveau De Courmelles. *Arch. d'électricité med.*, 1913, xxi, 201-219.
 Deaver. AMER. JOUR. OBST., Feb., 1911, lxiii.
 Findley. *Diseases of Women*, 1913.
 Gauss. *Strahlentherapie*, 1913, iii, 348.
 Gusserow. *Charité Analen*, 1886, xxi.
 Kelly. AMER. JOUR. OBST., 1903, vol. xiii, p. 289.
 Kimball. *Boston Med. and Surg. Jour.*, 1874, xc, p. 570.
 Koeberle. *Documents pour dervir.*, Strassbourg, 1865.
 Kohler. *Surg., Gyn. and Obst.*, May, 1913, p. 422.
 Kroenig and Gauss. *Berlin. klin. Wchnschr.*, 1913, 1, 1236.
 McDonald. *Jour. Obst. and Gyn. Brit. Emp.*, 1909.
 Martin. *Zeitscher. f. Geb. u. Gyn.*, 1890, xx, p. 1.
 Mayo. *Surg., Gyn. and Obst.*, 1911, p. 325.
 Miller. Quoted from Findley, *Diseases of Women*.
 Mohr. *Fortschr. a. d. Geb. D. Roentgenstr.*, 1913, xxi, 105.
 Noble. *Jour. Am. Med. Assn.*, Dec. 8, 15, 22, 1906.
 Olshausen. *Veit's Handb. d. Gynaek.*, 1907.
 Pean. *Union. medicale*, Sept., 1869.
 Pfahler. *Fortschr. a. d. Geb. d. Roentgenstr.*, 1913, p. 87.
 Pozzi. *De la valeur de l'Hysterectomie*, Paris, 1875.

Sampson. AMER. JOUR. OBST., N. Y., 1911, lxiv.

Schroeder. *Zeitschr. f. Geb. u. Gyn.*, 1882, vol. viii, p. 141; vol. ix, p. 204.

Stone. AMER. JOUR., OBST. 1910, vol. lxii.

Tracy. *Jour. Gyn. and Obst. Brit. Emp.*, 1908, vi.

Veit. *Handbuch der Gynaek.*, 1907.

4521 BEACON STREET.

TRANSACTIONS OF THE NEW YORK OBSTETRICAL SOCIETY.

Stated Meeting, December 9, 1913.

The President, HOWARD C. TAYLOR, M. D., in the Chair.

DR. W. E. STUDDIFORD reported the following case and presented the specimen from the same.

UTERUS WITH FIRM ADHESIONS FOLLOWING CESAREAN SECTION.

A patient, K. K., aged twenty-seven, was admitted to the Third Gynecological Service of Bellevue Hospital on November 28, complaining of constant, sharp pains in the lower abdomen and lumbar regions and with a history of having slight uterine bleeding every two weeks. These symptoms had followed a Cesarean section performed at Bellevue on February 1, 1913. This was the second Cesarean performed on this patient, the first had been performed in London six and one-half years ago.

The pain in the abdomen was referred to the region of the abdominal scars and was so severe as to incapacitate the patient from performing her usual household work. The patient came to the hospital seeking relief from this condition and a further request was made by the patient and her husband that, if any operation was performed, something would be done to prevent further pregnancies.

Examination of the patient showed a marked contraction of the pelvis, the true conjugate being estimated at about $2\frac{3}{4}$ inches; the cervix was high up in the vagina, the fundus was small and could be palpated just below the umbilicus; a distinct mass could be felt just to the left of the uterus which was diagnosed as a probable ovarian cyst. The right ovary was not readily palpable. There was a good deal of retraction along the middle section of the old abdominal scar, which extended from about 3 inches below the umbilicus to the ensiform cartilage. The lower scar was made with the first Cesarean section, the second scar was from a high incision extending from above the umbilicus to within an inch of the ensiform.

On opening the abdomen above the umbilicus the uterus was found firmly attached by two strong bands of adhesions to the anterior abdominal wall just above the umbilicus. These bands of adhesions were so distinct that they were at first mistaken for the

Fallopian tubes. On breaking up the omental adhesions to the fundus of the uterus, it was found that these were bands of muscular tissue forming suspensory ligaments for the uterus. On the right side the inner third of the tube was involved in these adhesions and the right ovary was adherent to the omentum. On the left side the tube was adherent to the sigmoid, the left ovary being apparently free and lying upon a retroperitoneal tumor, which on further examination proved to be the left kidney which was fixed in the left iliac fossa close to the brim of the pelvis. There were marked adhe-

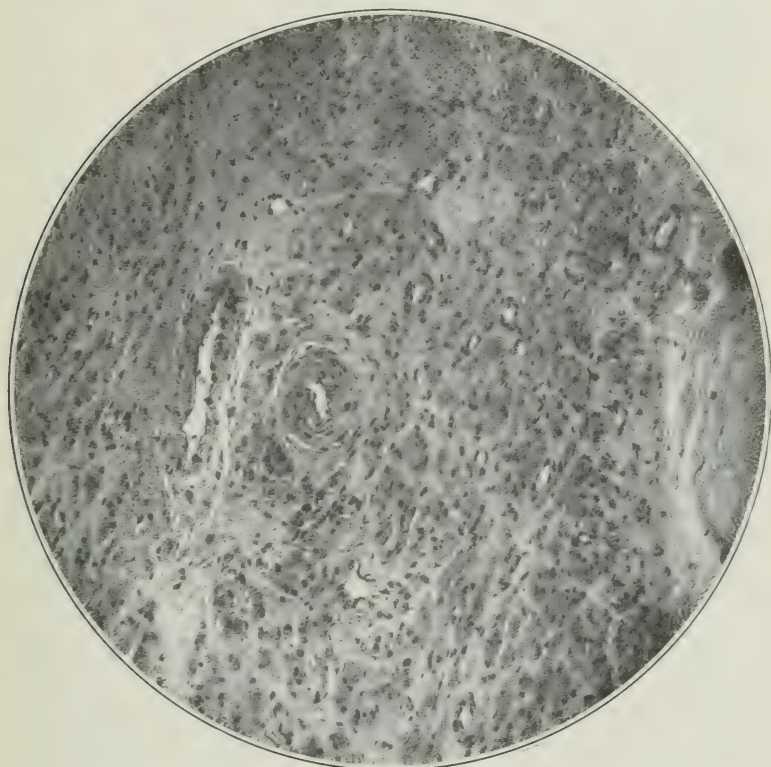


FIG. 1.—Adhesions following Cesarean section. Section of muscular bands holding the uterus to the abdominal wall.

sions between the posterior surface of the uterus and the upper portion of the rectum. It was also found that the chromic gut sutures used to close the wound at the anterior uterine wall had not been absorbed and were still to be seen beneath the surface of the peritoneum. The supravaginal portion of the cervix had been drawn out into a thin muscular tube by this suspension of the fundus high up in the abdomen. After the uterus and appendages had been freed of adhesions it seemed evident that the peritoneum covering

the uterus was so roughened that new adhesions were bound to form between the uterus and adjacent organs with the probable renewal



FIG. 2.—Section of uterine walls showing line of scar. A. Inversion of endometrium. B. Remains of chromic catgut suture.

of all the uncomfortable symptoms. For this reason it was deemed best that a supravaginal amputation of the uterus be performed,

leaving *in situ* the left ovary, which was the more nearly normal in appearance.

Operation was performed on December 1, the patient has made an uninterrupted recovery and, so far, has been relieved of those symptoms for which she came to the hospital for treatment.

There are several points of interest connected with the specimen which I here present; first, the firm bands of adhesions that have formed at the fundus of the uterus in spite of a high incision made with the intention of preventing adhesions. It seems remarkable that such dense, muscular bands should become attached to the abdominal walls. Second, the appearance of the chromic gut stitches in the uterine wound show that chromic gut may be almost a non-absorbable suture. Third, the microscopic views taken through the line of the scar in the uterus shows, that while the uterine wall has healed well, there is some inversion of the endometrium at the line of the incision in the uterine wall and there is a loss of continuity of the muscular fibers along the course of the incision which brings up the question of the strength of the uterine wall.

DR. E. B. CRAGIN in opening the discussion said,

"It seems to me that there are three interesting features about this case reported by Dr. Studdiford, and the first one brings up the question about the prevention of abdominal adhesions after a Cesarean section. Personally I do not believe that it makes any difference whether you make an incision above the navel or with the navel as the midpoint, if the incision is a short one, for the reason that whether you make it above or partly above and partly below the navel, at the end of a week the uterus is well below the incision in the abdomen. It does seem to me, however, that the amount of foreign material you use in the abdomen during your operation, makes a difference. I know not all agree with me, but it has always seemed to me that you are less likely to have adhesions if you keep abdominal pads out of the peritoneal cavity during a Cesarean section. I believe that this was tried in general abdominal work at St. Luke's Hospital, and the results seemed to be in favor of leaving the pads out. It has always seemed to me that by holding the uterus firmly up against the abdomen and without putting in pads, we can protect the peritoneum as well as with pads and with less risk of adhesions."

Another point of interest to me was in regard to the chromic gut. It has never seemed to me necessary to use chromicized catgut in the uterus during a Cesarean section. I have never used it anywhere but in the fascia, using plain catgut for closing the uterus and peritoneum, and for suturing the muscle, fat, and the skin, simply using as I have said, the chromic gut for the fascia of the abdominal wall.

The third point which interested me was that of a congenitally displaced kidney causing dystocia. The first one I ever met with was cystic, a case of the late Dr. T. Gaillard Thomas, and I removed it through the vagina. I delivered the woman the second day after my operation, but the child was at term and it caused no special

trouble although I was anxious for a few hours lest the ligatures should slip off during the labor. I delivered her in a subsequent pregnancy without any dystocia. My second case of congenitally displaced kidney causing dystocia, occurred at the Sloane Hospital. In that woman I have done five Cesarean sections and she still has her congenitally displaced kidneys. It seems to me the important feature about this is, that we should study to avoid the formation of these adhesions during Cesarean section, and personally I know of no better way than to keep the abdominal cavity as free as possible from any irritating material, whether it is a gauze pad or chromic gut.

DR. AUSTIN FLINT, JR.—“I am peculiarly interested in this particular case because I did the Cesarean section in February last. I cannot recollect the details of the operation accurately, but I do remember distinctly that I operated for the second time in this case, and I am sure I employed the technic which I have been following for all Cesareans for the last year or two; that is, to make a high incision entirely above the umbilicus for the purpose of avoiding what happened in this particular case. It may be that the traumatism and manipulation in sewing up the anterior surface left the uterus rough enough so that it would adhere to anything. The point about this specimen which particularly interested me, is the fact that the endometrium is inverted between the muscular fibers of the uterus, and if this operation had not been done and the woman had become pregnant, the question is what would have happened to that endometrium. An experience occurring last winter in a case of Cesarean section which was done by my assistant, Dr. James, illustrates the danger of pregnancy following one or more Cesarean sections. This woman had a Cesarean section done by someone else some years ago. In her second pregnancy she was in Bellevue Hospital and was seen by me, and as it was a small child, I allowed her to go through labor and delivered the child without any especial difficulty. The third time she became pregnant she presented herself at the hospital, and this time the child was large, so that after she had been only an hour or two in labor in was decided to do a Cesarean section, which was done by Dr. James late at night. When he opened the abdomen he found the scar of the first operation. Presumably the scar must have been firm at the time of the second labor because she delivered herself spontaneously. In the third labor the uterine musculature had separated, the membranes and sac were bulging through the scar and the child's foot projected up through this hole. The Cesarean section was done just at the right moment because the uterus was about to rupture and all they had to do was to tear the remainder of the scar open. So far she has been all right.”

“The other interesting point is in reference to the use of chromic catgut. I have always been afraid to use plain catgut in the uterus because of a fear which I have that it may absorb too quickly.”

“In speaking about the cause of adhesions in this particular case I do not believe that any incision through the abdomen would have

made a difference. It was simply the roughness of the anterior uterine wall. It teaches a lesson which is, that Cesarean section ought not to be performed lightly or unadvisedly in any case, because of the unknown dangers which might occur in a subsequent labor."

DR. O. P. HUMPHSTONE.—"I have had the privilege of doing a third Cesarean on one woman and seven second Cesareans, and in only one case have I found adhesions of great density. Here I did a Cesarean because of a ventral fixation. She had the typical result in pregnancy of ventral fixation of the uterus, done by suturing the back of the uterus firmly to the anterior wall just above the pubis. The development of the pregnant uterus had been in the posterior wall. She had the characteristic shelf of the hypertrophied unlengthened front wall of the uterus, acting to cause dystocia. After her Cesarean operation the woman had a rather stormy convalescence because of the poor drainage of the uterus. Four or five months later she began to complain of much dragging abdominal pain and examination revealed an elongated mass extending up from the fixation incision to the lower end of the Cesarean incision. I opened the abdomen and found the elongated mass was the cornua of the uterus drawn out to about 4 inches in length from her ventral fixation up to her Cesarean wound. I did a hysterectomy and relieved her entirely of all symptoms."

"Dr. Flint spoke of the short length of the Cesarean scar that had opened in his case. My own observation has been in these reopened cases that the scar is very short in the uterus. It has been my privilege to put my hand in the uterus in two cases after labor, *via naturalis*, following previous Cesarean sections, and in each of them I could feel the very much thinned out portion of the uterus where the scar was."

"There is one other point I would refer to and that is: in doing repeated Cesarean section, the difficulty from adhesions increases in my experience with the number of Cesareans the woman has had, and I would prefer not to make the incision through the abdominal wall, after the second Cesarean, in the same place, but to make it through the other rectus muscle and in that way troublesome adhesions are more easily managed. There is one other factor in the prevention of adhesions that I would like to mention. These adhesions begin to form early and the firm contraction of the uterus right after the Cesarean, by means of small doses of pituitrin, will help keep the uterus away from the abdominal wound and prevent the formation of the serious adhesions."

DR. R. F. FRANK.—"In reference to this case of Cesarean section, I should consider the microphotograph shown, a specimen of very perfect union. In fact I think that the scar in the endometrium, smooth as it appears in this section, should not be considered pathological. You frequently get as much downgrowth and folding in a contracted uterus. My own experience in Cesarean section is practically negligible, but I have often wondered why Cesarean section should take such an entirely different position in surgical

operations from the ordinary operations on the uterus. From what others report there must undoubtedly occur undue formation of adhesions. At term some other factors appear to disturb the healing of the uterus, but why these uterine wounds should show this undue tendency to form adhesions I am not able to explain, nor do I believe that anyone has explained it. What I want to ask now is this. Why has the extraperitoneal Cesarean section received so little attention in America? If the operation is to be employed why not use a simple technic, such as pushing down the bladder and incising the extraperitoneal lower uterine zone? I mean an operation which consists in incising the peritoneum at the vesicouterine junction, pushing down the bladder and incising through the thinned out lower uterine segment. A recent article by Sigwart appealed to me very strongly, in which he reported nine or ten cases in which he was able to do Cesarean section through this zone, sutured up the

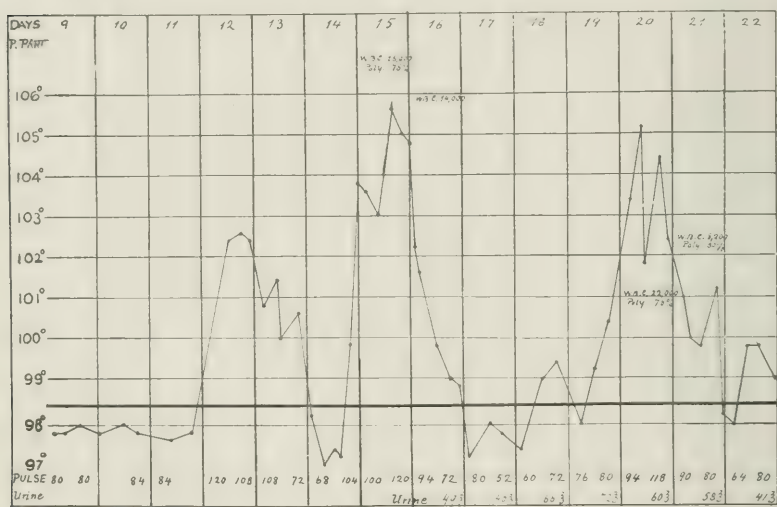


FIG. 1.

thinned out musculature and covered the uterine wound by pulling up the bladder and suturing it in its new location. He apparently believes that this thinned out segment is less liable to postoperative and postpartum infection and ascribes much less influence to peritoneal infection due to the amniotic fluid than to secondary infection from an unprotected uterine wound. His results in nine or ten cases, are of course too small in number to be conclusive, but the whole discussion of the subject gave a hint as to the difference between infection taking place from the uterine wound made in the thick portion of the uterus and the thinned out zone. It seems to me that hint is well worth investigating."

DR. W. S. STONE.—"I had a case several years ago at the Lying-in Hospital in which I performed an abdominal Cesarean section, which

presented a postoperative condition that I think is closely related to the complications in Dr. Studdiford's case. The operation was elective and there were no preoperative conditions to justify anticipation of such a complication as occurred. During the first ten days, however, after the operation, the course was such as to make us more anxious than usual. The patient's convalescence was slow, and after getting up, the presence of more or less constant abdominal pain was finally judged to be due to a strong adhesion of the uterine fundus to the abdominal wall immediately beneath the scar of the wound, which was almost entirely above the umbilicus. The conditions were such that an operation was performed, cutting through the old wound and finding the following conditions present. A large piece of the omentum was firmly adherent to the parietal peritoneum just beneath the wound, and this in turn was found to be firmly fixed to the anterior wall of the uterus. More than this, however, the incision made in the uterus at the time of the Cesarean section had evidently failed to unite along its entire length, so that the omentum filled in the open wound. This case illustrates two or more interesting points in regard to the disposal of the omentum under certain pathological conditions, but I refer particularly to the fact that the presence of adhesions is often due to faulty technic in the performance of operations. In this case I think, perhaps many of us would ascribe the failure of the uterine wound to unite, to the use of improper suture material. I, however, have been less inclined to blame suture material than perhaps most of us. It was due I think to faulty suturing of a wound with muscular walls of unequal thickness. This can be avoided by being careful to incise the anterior wall exactly in the median line and parallel to the long axis of the uterine wall."

DR. STUDDIFORD in closing the discussion said: "I think the prolapsed kidney simply added to the dystocia. I wondered why these adhesions should form along the course of the scar. The lower angle of Dr. Flint's incision was in direct line with the upper angle of the old incision and the question has now come up in my mind whether the condition of the peritoneum after the second incision was such that adhesions readily formed there and the only reason that I can find or can think of why muscular bands should have formed there, is that firm adhesions resulted very soon after the last section was performed. That is, the peritoneum covering the uterus became firmly adherent to the scar of the old incision, and then as the involution went on it simply drew out some muscle fibers from the uterus. I am glad to hear Dr. Frank's statement that he believes the inversion of the endometrium will not cause any particular difficulty, but it struck me when the specimen was examined that it was a condition that had formed in the wall of the uterus and one that would be very difficult to avoid. I don't see how any one could make a distinct apposition there and feel sure he could get a smooth surface along the endometrium and the picture of the scar looked at any rate a little bit suspicious, and if a third

pregnancy had occurred it might have caused some trouble at the time."

DR. L. GRANT BALDWIN presented

A PRELIMINARY REPORT OF A CASE OF PRIMARY TUBERCULOSIS OF
THE BLADDER.

"Mrs. X, aged thirty-seven, had two children, one miscarriage. The only case of tuberculosis in her family as far as can be traced was that of her mother, a sister who died at the age of thirty-six, eighteen months after catching a severe cold."

"Present illness began in August, 1912, symptoms of which were an irritable bladder, frequent and painful urination, but not exaggerated at night. This continued until July 20, 1913, but did not incapacitate her before that time. She was able to take violent and prolonged exercises, and lived largely in the fresh air."

"I first saw her August 16, 1913, in consultation. At this time, an indefinite mass about the size of a large olive, could be made out in the apex of the bladder. Urinary examination showed a large amount of bladder epithelium, only a small amount of pus, no tubercle bacilli, no albumin or casts. The kidneys were easily palpable, not enlarged and not tender.

On August 17, 1913, the patient was removed to the Skene Sanitarium, Brooklyn. Two days later under ether, the bladder was cystoscoped. This showed an ulcerated area as large as a silver dollar in the apex of the bladder. The trigone was irritated but the urethral orifices were not particularly inflamed. No attempt was made to catheterize the ureters.

The bladder was opened suprapubically and extraperitoneally. The ulcerated area was thoroughly cauterized with an electric cautery, the wound closed and a drainage catheter left in the urethra. The catheter was removed on the seventh day after operation and the patient was out of bed on the thirteenth day. All vesical symptoms rapidly improved, and the patient went home September 22.

"Within a few days the symptoms of painful and frequent urination returned and on October 4, the patient came back to the sanitarium. A drainage catheter was now used for sleep and freedom from pain. At this time a guinea-pig was injected with bladder urine and autopsied three weeks later, showing marked tuberculosis of the peritoneum, omentum, and spleen."

"November 3, the patient was seen in consultation with me by a prominent genitourinary specialist, who confirmed my diagnosis of tuberculosis of the bladder, but he considered the primary lesion to be in the left kidney. He succeeded in catheterizing the right ureter, the urine from which was normal. The left ureter could not be catheterized."

"November 5, an x-ray picture was taken. The picture showed both kidneys normal and symmetrical in every way.

November 10, another attempt, without success, was made to catheterize the left ureter. At no time has there been pain or tender-

ness in the region of the kidneys. Except for a few days immediately following the operation there has been no rise of temperature, no cachexia or emaciation, beyond that incident to ordinary illness.

Since the last attempt to catheterize the left ureter the pain and frequency of urination is somewhat diminished and the patient is able to go from one to two and one-half hours. For one week she has had installations of Gumenol oil in the bladder. The mass in the apex of the bladder is now (Dec. 9, 1913) much diminished in size, the patient is gaining weight and seems to be getting well.

DISCUSSION.

DR. H. D. FURNISS in opening the discussion said: "Before discussing this case I should like to ask Dr. Baldwin what was the difficulty in catheterizing the left ureter and if he was unable to get the catheter to enter that ureter at all."

DR. BALDWIN.—"It was a bullous condition of the orifice of the ureter and the catheter could not be made to enter."

DR. FURNISS.—"I do not think that Dr. Baldwin has any ground on which to make a diagnosis of primary tuberculosis of the bladder. To my mind this condition of bullous edema about the ureter, with the finding of tubercle bacillus in the urine is proof of the tuberculous involvement of the kidney. I think it was bad practice to even attempt to catheterize such a ureter, as practically no further information of value was to be gained by such a procedure. Another point to which I wish to refer, is that in many cases of renal tuberculosis there is involvement of the superior vesical wall just as described by Dr. Baldwin; this involvement is at a point just opposite the ureter in the collapsed condition of the bladder. I have a patient under observation now from whom I removed a tuberculous kidney two years ago. Since then the ureter of that side has healed, but there still is on the vertex of the bladder, just such a lesion as described by Dr. Baldwin."

DR. H. GRAD.—"The experiments of Albaran in 1898 and Bernard and Salomon in 1904 show conclusively that primary tuberculosis of the bladder must be exceedingly rare and as Dr. Baldwin says, he cannot really prove that his case is one of primary tuberculosis of the bladder. The reason that it is so very difficult to prove this, is the fact that it is almost impossible to disprove the presence of a tuberculosis of the kidney in these cases. The difficulty of disproving the presence of a tubercular kidney also is so great that even with the kidney removed, the minute tubercular lesion may be overlooked. In a case reported by Kapsammer, the excised kidney was cut into twenty sections and only in one of these was a tubercular lesion found, so minute was the focus of the disease."

DR. JOHN O. POLAK.—"I wish to put on record a case which I reported some years go of primary tuberculosis of the bladder. I saw the girl a few days ago, nine years afterward, and she is in perfect health. This was a case of primary tuberculosis of the bladder with a large ulcer almost the size of a half-dollar, just posterior to the

ureteral orifice. It was treated by thorough cauterization with the actual cautery through a vesicovaginal fistula which also drained the bladder. I subsequently closed the fistula. The ulcer healed in two months. Repeated catheterization of the ureters failed to show any kidney foci. Cystoscopy shows an absolutely healed ulcer and I am very confident in this instance that it was a case of primary tuberculosis. I had Dr. Kelly see this girl with me (the case is reported in his book) and he concurred in the opinion that it was a case of primary tuberculosis of the bladder. I have seen other cases which had the primary focus in the kidney. My last one was a young girl who complained of nocturnal irritation and examination showed a small ulcer near the right ureter orifice. Ureteral catheterization showed absolutely nothing and yet on inspection of this kidney, I found in the cortex two or three tuberculous foci and the kidney on section showed many minute foci, none of them communicating with the pelvis and only a few communicating with the tubules.

DR. H. N. VINEBERG.—“I want to repeat what has been said as to the rarity of tuberculosis of the bladder, but still I don’t see why it should not occur, because almost every organ in the body may have what is ordinarily termed primary tuberculosis. Dr. Baldwin’s case must be considered uncertain until the kidney has been exposed and found free of tuberculosis. It is interesting to note that in thirteen cases of nephrectomy I have done during my career, nine have been treated for cystitis for a variable period of from several months to two years, as there were no symptoms referable to tuberculosis of the kidney. The symptoms that show themselves first are those of the bladder, and not of the kidney, but although I don’t deny the occurrence of tuberculosis of the bladder, still I think the doctor’s case will have to be observed still further before it is to be accepted as primary tuberculosis.”

DR. L. GRANT BALDWIN in closing the discussion said:

“My main object in reporting the case was on account of the rarity of the condition. As I said in the beginning, it was a preliminary report and gave the reasons therefor. The condition about the left ureter occurred subsequent to the operation. At the time of the operation the bullous condition did not exist about the left ureter. Just because the condition is rare it hardly seems that we should say it was not possible to occur. It is very unusual that there has never been any fever and no symptoms referable to the kidneys at this date, eighteen or nineteen months after the onset of the symptoms. An absolute diagnosis can of course not be made at this time.”

DRS. GEO. W. KOSMAK and WM. J. MARONEY each reported a

CASE OF COMPLETE INVERSION OF THE UTERUS

Dr. Kosmak’s case was as follows:

Mrs. J. M., aged nineteen, para-ii, of Italian descent, had a normal delivery in June, 1912, and made an uninterrupted recovery. On

October 21, 1913, she was admitted to the Lying-in Hospital with the following history. She had been in labor approximately forty-eight hours with severe pains all over the abdomen from the time the first one began. She was confined by a midwife who delivered her of a normal baby. Everything was stated to have progressed nicely and very little blood was lost during the birth of the child or immediately afterward. Fifteen minutes elapsed and the placenta was stated to have been expressed spontaneously with one strong pain. Traction on the cord or pressure over the fundus was denied. Fifteen minutes after the birth of the placenta, the patient began to bleed freely and alarmingly. The midwife did nothing for the hemorrhage but at once called in a physician who immediately began to attempt to pack the uterus (*sic*) with gauze. For a few minutes the bleeding stopped but began again as soon as the physician had left. Another physician was called in who added further packing to what was already in the vagina. Neither of these doctors made a thorough examination and were not aware of the true state of affairs. As soon as the packing became saturated with blood, a fresh hemorrhage took place and two more physicians were called, each of whom added to the gauze packing previously introduced. The patient got rapidly worse and the last physician advised sending her to a hospital. He had suspected the true condition of affairs. She was therefore admitted to the Lying-in Hospital about two hours postpartum in a condition of almost complete exsanguination, profoundly shocked and on the point of collapse, with cold clammy skin and in a condition of extreme pallor.

While preparations were made for examination, an intravenous infusion of 1000 c.c. of normal saline was given together with a hot coffee enema, and camphor by hypodermic. The patient was then carefully anesthetized with ether and a vaginal examination made. The packing together with numerous blood clots was removed and then it was seen that the supposition of the last physician who saw the patient, was correct; namely, that a complete inversion of the uterus was present with the inverted fundus at the ostium. There was no bleeding at this time. The vagina was irrigated with hot saline and a piece of placental tissue the size of the palm of the hand was separated from the uterus to which it was apparently adherent. An effort was then made to reduce the inverted uterus which was accomplished without any great difficulty although free bleeding again resulted. With the hand in the uterus, a douche of 8 quarts of iodine solution ($1/2$ dram to the quart) at a temperature of 120° F. was given, the fundus being thoroughly massaged in the meanwhile. There was an absolute lack of tone in the uterine muscle and it was only toward the end of the douche that contractions were again noted. A piece of membrane as large as the hand was extruded during this procedure. With the hand in the uterus, the cavity of the latter was packed with a 2-inch strip of iodoform gauze, about 12 yards being required for this purpose. As soon as the uterus had been replaced, a hypodermic of 40 minims of ergotole was given. The patient reacted quite promptly from the deep shock present at

the time of admission. The pulse which could scarcely be felt, again became quite full and its rapidity 120. Before leaving the table, a pint of saline with 1/2 ounce of whiskey was given and rectal salines every six hours.

The patient developed a condition of sepsis, with temperatures ranging from 101° to 104° F. for a period of almost three weeks. The lochia was foul, purulent, and an exudate was present in the parametria. The red cell count on the day after delivery was 1,850,000 with 22,400 white cells and about 40 per cent. hemoglobin. The patient made a good recovery and was discharged on the thirty-eighth day in good condition, with the uterus well involuted and the parametritic exudate practically gone.

The comparative rarity of the condition is shown by the fact that only two other cases are on record in the service of the Lying-in Hospital. In one the uterus was found inverted when a "student" arrived. The attending washed off the uterus, replaced it and the woman made a good recovery. The other case was a five months' pregnancy delivered by an outside physician, who inverted the uterus during the extraction of the child with instruments. The patient was in deep shock from hemorrhage but made a good recovery after the uterus was replaced after being thoroughly washed off.

DR. MARONEY'S

CASE OF COMPLETE INVERSION OF THE UTERUS

was as follows:

Mrs. F., aged nineteen, married, primipara. Menstrual history, normal. Family history, negative. Previous history: typhoid fever in September, 1912; no complications or sequellæ. Became pregnant the latter part of the following November. Pregnancy normal. Delivered at a private sanatorium August 26, 1913. The history of the labor and technic of delivery of placenta was not ascertained from the obstetrician. The patient herself says that her delivery was without an anesthetic or instrumental aid. After the placenta was delivered she became unconscious and believes she remained so for more than an hour. She was in bed for fifteen days during all of which time she continued to have a moderately free bloody discharge. She was sent home, September 15, nineteen days postpartum. No vaginal examination had been made.

September 19, twenty-four days postpartum, I saw her with Dr. M. F. O'Rourke, who was called in that day. She complained of weakness but no pain. Her appearance was that of a severe secondary anemia. The temperature was 100.8° F., pulse 120. The uterus was found to be completely inverted, but presented no gross evidence of infection. She was removed to St. Vincent's Hospital, and prepared for operation both abdominally and vaginally. The next morning, under general anesthesia, the cervix was found to be relaxed and dilatable. It was dilated manually by a combination of the methods of Harris and Edgar. By pressure directed in the axis of the pelvis, alternately on the horns and finally

on the fundus, with counterpressure from above on the cervix, the uterus was reinverted. The time of the whole procedure was twenty minutes. She menstruated October 27. The flow was scanty, lasting but three days. No pain. No menses since.

At present she is in fairly good health but somewhat anemic. Her uterus is well up in the pelvis, anteverted and anteflexed. The cervix is flabby and both the external and internal os admit one finger easily.

Without a reliable history of the labor it is not possible to determine whether the cause of the inversion was spontaneous, or due to too great pressure on the fundus or traction on the cord. However, it may well be that the onset of pregnancy before full convalescence from typhoid fever produced a laxity of the uterine walls which was the predisposing factor; even though it did not lead to a sufficient degree of inertia uteri to call for operative assistance in labor.

DISCUSSION.

DR. H. C. BAILEY.—“I saw one of the latter cases when I was on the staff of the Lying-in Hospital in 1903 and it was so amazing that I think it is worth while mentioning. On my arrival I found the uterus was lying between the patient's thighs. It was in the summer time and the flies were buzzing about the room, and I have no doubt had already alighted on the uterus. I washed off the inverted uterus with bichloride solution and then after anesthetizing the woman I had considerable difficulty in replacing the uterus, and the difficulty lay at the cervical neck. I worked for over fifteen minutes with my hand shoved into this huge mass and finally it went back with a gush. Then we took the woman to the hospital, and Dr. Painter, who examined her, found that the fundus of the uterus had dropped a short way but had not come down more than a few inches. He packed the uterus with gauze and the patient's recovery was practically uninterrupted.”

DR. E. B. CRAGIN said:

“There is one thing to emphasize in the etiology of inversion of the uterus and that is the ease with which the fundus can be pushed down into the cavity and through the cervix if pressure is made when the fundus is relaxed. Dr. Kosmak presents evidence that he did not exert undue pressure on the fundus. I do not think that we have evidence, however, that some of the other doctors who were called to stop the hemorrhage, did not maltreat that uterus during this procedure. Didn't one of the doctors called massage that fundus to stop the hemorrhage and in so doing inverted the uterus? Such an accident is perfectly possible if forcible pressure is applied to the fundus while it is relaxed and Dr. Kosmak in his report, states that even after he saw the case, the uterus had little contractile power. I have seen this occur at the Sloane Hospital when a man practised the Credè method of expression of the placenta while the fundus was relaxed, rather than contracted, as is taught. The ease with which this can be done is worthy of note and perhaps explains the cases presented here tonight.”

DR. W. S. STONE.—“My third case in private practice, shortly after my interne service at Sloane, and having as an assistant, a colleague who also had recently served in a similar position at Sloane. was a case of acute and complete inversion of the uterus, which neither of us were able to replace, and which terminated fatally within a few hours. The patient was a primipara, intensely neurotic and more fearful of a fatal result than any one I have ever seen. The degree of her nervousness is shown by the fact that prior to pregnancy she had been treated for vaginismus. If we add to this neurotic element the fact that the cervix was completely dilated and the membranes ruptured before she experienced any pain, it seems that it is suggestive in studying the causes for such an accident to ascribe it to some pathological innervation of the uterine musculature rather than to traction on a short cord.”

The first paper of the evening was read by HENRY DAWSON FURNISS, M. D., entitled

COLON BACILLUS INFECTIONS OF THE URINARY TRACT IN WOMEN.*

The second paper was read by EBEN FOSKETT, M. D., entitled

COLON BACILLUS INFECTION OF UTERUS, TUBES, AND OVARIES.†

DISCUSSION.

DR. G. G. WARD, JR. (opening the discussion).—“I was very much interested in Dr. Furniss’ contribution, particularly because through his courtesy I had the opportunity of seeing a case that he reported, in which the conditions were certainly most bothersome and required marked perseverance on his part to obtain a satisfactory result. He reported the patient as having had one kidney already removed prior to coming under his care and she had most distressing bladder irritability due to chronic colon bacillus infection. In addition she had suffered from attacks of pyelitis during a period of over a year. My recollection is that these attacks were several months apart and she apparently was completely over the pyelitis attacks in the interval, although still distressed with her bladder. I rather gathered from what Dr. Furniss said in his argument, that his leaning was toward the belief that the majority of these cases of colon infections in the bladder are hematogenous in origin rather than of an ascending type. I would like to ask him if in this particular case which I have been quoting and which I had the opportunity of seeing, whether he does not consider that there was some likelihood of the infection being an ascending one, rather than a hematogenous one. He spoke of the fact that she had a small rectovaginal fistula and that he ultimately succeeded in relieving her of her bladder symptoms by making a vesicovaginal fistula for drainage for a prolonged period, and in these very obstinate cases that seems to be our only sheet anchor for

* For original article see page 448.

† For original article see page 452.

the relief of bladder irritability. By his drainage he cleared up the bladder and relieved the condition of pyelitis. In case of the infection originating in the kidney, might she not still have symptoms of pyelitis, perhaps in a month or two again, because in her past history there was a number of months interval between the severe attacks which she had? It seems to me that as he has relieved the cystitis by drainage and closed the rectovaginal fistula, and as her pyelitis symptoms have been in abeyance since the early part of last January, that the infection in this case might have been an ascending one, perhaps originating from the rectovaginal fistula rather than of hemogenous origin."

DR. H. N. VINEBERG.—"I would like to ask the doctor whether he would consider the mere presence of the colon bacillus in the urine without any other element such as obstruction, as likely to give rise to symptoms. I had a case a short time ago, a lady from Chicago, who seemed to have been overtreated by her physicians because they found bacteria in her urine. I examined the woman very carefully, examined her bladder and found absolutely no pathological lesions present and no abnormal elements in the urine, except that she had bacteria, and she was really very much better during the time she remained in New York, as she received no treatment whatever. She had been overdosed with urotropin and other drugs."

"In reference to the blood infections with the colon bacillus, we have had in Dr. Krug's service at Mt. Sinai Hospital in the past four or five years, two puerperal cases of colon bacillus infection of the blood. I cannot remember whether the first one recovered or not, but the second one did recover. Recently we had a case of colon bacillus infection of the blood following a plastic operation. The woman was very ill but she finally recovered."

DR. F. R. OASTLER.—"I think the action of the colon bacillus depends very largely upon the virulence of the organism and also upon the condition of the patient. It was called to my attention some years ago, that in the cases of acute catarrhal colitis, which are especially prevalent in the summer time, if we watched carefully the urine in the same we would very often find the colon bacillus present. I took the trouble to do that for two or three summers and found that in a very large proportion the colon bacillus was present in the urine in large numbers. At that time it was suggested to me in the treatment of those cases, that if I would administer urotropin combined with benzoate of soda, I would find that my colon infection would disappear as well as the colon bacillus in the urine. I have been doing that with good results. The colitis seems to clear up under the administration of large doses of urotropin and sodium benzoate, and the colon bacillus disappears. I have had under my care two women, one for fourteen years and one for about eight years, who have had a colon bacillus cystitis. What I mean by that is, their urine is either neutral or slightly alkaline, of low specific gravity and contains pus. They have no subjective symptoms at all. Both their urines show the colon bacillus. The administration of urotropin clears up the urine, but on its discontinuance the colon bacillus

reappears, the urine becomes turbid and evidences of cystitis appear. Their urine has never remained clear and the condition has never been cured, for the women to-day are apparently in good health with colon bacillus in their urine, with pus, and a reaction varying from neutral to slightly alkaline. The colon bacillus here seems to give no subjective symptoms. Some four years ago when I was working on the subject of the use of bacterins in the treatment of septic infections, abortions, etc., at Lincoln Hospital, we examined about 140 cases of streptococcus, staphylococcus, and bacillus colon infections, and it was surprising to find how often where we got cultures, the colon bacillus was present. It was interesting to find also that pure staphylococcus or streptococcus infections were not common, that a large number of them were mixed infections, in which the colon bacillus was nearly always present. We were therefore led to conclude that a great many of our pelvic infections are due largely to mixtures of some other pyogenic organisms with the colon bacillus. The severity of the disease seemed to depend not so much upon the kind of organism causing it, as upon the virulence of that organism and the resistance of the patient."

"A word about vaccines. We got some definite results from the use of mixed autogenous vaccines, whether they were in mixed staphylococcus or streptococcus infections."

DR. RAWLS, in discussion, said: "For some time past my attention has been especially directed to colon bacillus infection and therefore I have been much interested in the papers of the evening. I feel certain that the bacillus coli is the cause of many urinary infections and also the source of many gynecological and obstetrical complications. However, we must have further evidence than simply a colon bacilluria or bacteremia or finding this organism in the pus from a tube or pelvic abscess."

"We are all probably familiar with the experiments of Williams, Murray and Wallace, in which they examined the urine of a series of gynecological patients and found that a little over 42 per cent. before operation and a little over 92 per cent. after operation had colon bacilli in their urine without any evidence of infection."

"Recently also Dr. Ethel Williams in her study of the urine of seventy women taken at random from a general practice, found that of forty-four suffering from chronic intestinal disorders, sixteen had a colon bacilluria and of the remaining twenty-six, who gave symptoms only of frequent and painful urination, none had a bacilluria. She found further that by treating the intestinal conditions the bacilluria disappeared in most of her cases and the percentage of colon bacilluria in women in general practice was about 22 per cent."

"As to bacteremia, Römer, in some recent work done in Schottmüller's clinic, found that of 171 cases of abortion artificially terminated, the blood cultures remained sterile in only forty-seven. He found the bacillus coli in pure culture and mixed with other organisms as the most frequent cause of infection. Cultures were also positive in some afebrile cases."

"My contention is that in reporting and diagnosing cases of colon

bacillus infection one must have more evidence than simply a colon bacilluria, a colon bacteremia or colon bacilli in the pus."

"As to the treatment of colon bacillus infection of the urinary tract, I have found of most value the use of acid sodium phosphate (NaH_2PO_4), in combination with urotropin, as suggested by Jordan. Do not prescribe them in the same mixture or give them at the same hour. The acid sodium phosphate is best given in the crystal and the urotropin in tablet form, each being dissolved at the time of taking."

DR. FURNISS in closing the discussion said:

"I will first answer Dr. Ward concerning the patient he spoke about. I did a cystotomy on her in March, 1913, closed the fistula in June, 1913, and she was perfectly comfortable until a week ago. Since then she has had some pus in the urine and pain in the urethra, but has had no attacks of chills or temperature."

"In answering Dr. Vineberg, I will read three lines from my paper. In cases of pyuria and bacteriuria with symptoms of retention, the patient has practically no discomfort other than some vesical and urethral irritation. I think that injections of vaccines are the best treatment and the topical treatment is often overdone. Dr. Oastler spoke of the relationship between colitis and involvement of the urinary tract. Such a relationship is common, and is frequently noted in colitis and appendicitis. Recently I saw a rather severe case of cystitis in a woman who had a few days previously passed a large mucous cast of the intestine."

"Many cases in which the colon bacillus is found in the urine present no symptoms, but naturally most of the cases that I see come to me complaining of various forms of discomfort, and when I find in them the colon bacillus, I believe that it is the organism at fault."

"When urotropin is given and the urine remains alkaline, it is seldom of any benefit, and in such cases we must take measures to render the urine acid. This is best done by giving acid sodium phosphate. According to Hinman of Baltimore it is not necessary to make an estimate of the amount of formaldehyde found in the urine of patients taking urotropin, but it is sufficient to determine the acidity of the urine. In a urine that requires 20 c.c. or more decinormal sodium hydrate solution to neutralize 100 c.c. of urine, we can assume that the urotropin has been split up."

TRANSACTIONS OF THE OBSTETRICAL SOCIETY OF PHILADELPHIA.

Meeting of October 2, 1913.

The President, GEORGE M. BOYD, M. D., in the Chair.

DR. GEORGE W. OUTERBRIDGE, read a paper on

THYROID TISSUE TUMORS OF THE OVARY.*

DISCUSSION.

DR. EDWARD A. SCHUMANN.—The particular point of interest with reference to these tumors lies in their etiology. Inasmuch as the ovary may be said to be almost a normal habitat for thyroid tissues it seems strange that such growths are not more frequent and that they are not purely thyroid in type. There is no morphological reason to my knowledge, why they should not develop at the entire expense of the ovarian structure.

Regarding the functioning power of these tumors we cannot speak definitely from the clinical standpoint, as they are rarely diagnosed prior to careful pathological examination, and hence no comparison is possible between the thyroid output of the patient before and after the removal of the growth.

It would be of interest to prepare an extract of these thyroid tumors of the ovary, and test it as a pharmacological product. Should it prove to possess thyroid properties, we would have presumptive evidence that the tumor had acted as an accessory thyroid while *in situ*.

DR. E. E. MONTGOMERY.—I do not feel competent to discuss the paper, but I do wish to compliment the gentleman upon the excellent presentation he has made, and express my appreciation and pleasure in having heard it read.

DR. B. F. BAER.—Dr. Montgomery has said about what I had intended saying. I will only add that I congratulate the Society upon having in its membership a young man of such industry and scientific attainments as is shown in the excellent paper. My own experience agrees with Dr. Outerbridge's conclusions as to the clinical significance of these tumors, at least. As to their relation to the thyroid gland I do not know.

* Paper published in JOURNAL for December.

DR. B. C. HIRST.—I would like to bring to the attention of the society:

THE NEW METHOD OF TREATING PYELITIS BY WASHING OUT THE PELVIS OF THE KIDNEY WITH A TWO WAY CATHETER.

In the last few months, six cases have been treated by this plan in my hospital services with almost immediate disappearance of the symptoms, although in some instances the women were brought in very ill, with high temperature, great pain over the kidneys and purulent urine. The two-way catheter is passed through the ureteral catheter canal of the latest model water distention cystoscope and passed up the ureter to the pelvis of the kidney in the usual manner; it is then easy to inject, first boracic acid solution, followed by a solution of one of the silver salts—I prefer heganon—with a suitable syringe provided with a delicate nozzle. No precaution need be taken about the quantity of fluid injected as its return flow is provided for. It is this advantage of the two-way catheter that makes the treatment so safe, satisfactory and successful. We have learned by former experience the dangers of injecting the pelvis of the kidney with the ordinary ureteral catheter: the infiltration of the stroma out to the capsule and necrosis of the kidney structure.

One lesson these cases taught me I must remember in the future. As the temperature sank to normal promptly, the pain disappeared and the urine cleared up, the patients were discharged in three or four days, presumably cured. At least three of them had a recurrence after leaving the hospital, as I learned later, not so severe as the first attack and yielding to medicinal treatment. Hereafter I shall keep such patients under observation longer and must be prepared to repeat or continue the irrigation of the kidneys for several days after all symptoms have subsided.

DR. STEPHEN TRACY.—I have always treated acute pyelitis in the usual way—rest in bed, ice bags to the region of the kidney, large quantities of liquids, urinary antiseptics, and supporting treatment. I have never treated acute cases by irrigation as I have always been afraid that the pyelitis would be converted into a pyelonephritis or a pyonephrosis. I am very glad indeed to have heard the reports of the cases Dr. Hirst has treated by irrigation as his results have been so remarkable. The treatment should be given a further trial in order to determine its real value. If this line of treatment is to be carried out it certainly should be done through the two-way catheter, in order to avoid any pressure on the kidney. If the irrigations are to be made through the ordinary catheter, extreme care should be taken not to overdistend the pelvis of the kidney and force the infection into the calices, or even into the kidney substance proper. When injecting the kidney through the ordinary catheter the inflow should be stopped as soon as the patient complains of discomfort. If more fluid is injected it will cause pain and if still more is forced in, the patient will have a violent attack of colic. We now know that the in-

jection of the kidney with a silver salt for the purpose of pyelography is not the innocent procedure that we at one time thought. In a number of cases the fluid has been forced into the substance of the kidney and has caused areas of necrosis, and in some cases has gone as far as the capsule, which it has dissected up. I have used a variety of silver salts but have finally returned to silver nitrate, as better results are obtained. As a lubricant for the urethral catheter I have found sterile vaseline to be of the greatest value.

(*To be continued.*)

TRANSACTIONS OF THE NEW YORK ACADEMY OF MEDICINE.

SECTION ON OBSTETRICS AND GYNECOLOGY.

Stated Meeting, Held December 23, 1913.

DR. GEORGE GRAY WARD, JR., *in the Chair.*

DR. A. H. HARRIGAN reported a case of

NEPHRECTOMY DURING PREGNANCY.

The patient was a woman, twenty-one years of age, who was admitted to Fordham Hospital, January 24, 1913. The family history was negative. She was pregnant four months. Her present illness began ten days previous to her admission to the hospital with an alveolar abscess, which opened spontaneously. Two days later she had severe pain in the back and a chill. The pain had persisted and became more severe. The temperature ranged from 100° to 103.5° F. The pain became general over the abdomen, the greatest intensity being in the right lumbar region. There was no increase in the frequency of urination and no burning sensation. The bowels were constipated.

Physical examination showed the abdomen moderately distended. The pregnant uterus was felt through the abdominal wall. The right kidney could be felt, was enlarged and tender. There was extreme tenderness in the right costovertebral angle. Examination of the lungs, heart, liver, and spleen was negative. The left renal region was also negative. The white blood count was 34,800 and the polynuclears 88 per cent. Examination of the urine showed it to be acid, with a specific gravity of 1030, and with a moderate amount of albumin, but no sugar. It contained a large number of pus cells and hyaline and granular casts. A diagnosis of infection of the right kidney was made, either a pyelonephritis

secondary to a puerperal pyelitis or multiple septic infarcts of the kidney in view of the history of the alveolar abscess.

Nephrectomy was performed under ether narcosis. A right oblique lumbar incision was made. The perirenal fat was infiltrated. The kidney could be readily inspected and the surface presented innumerable foci of suppuration. The diagnosis of multiple septic infarcts was made from the macroscopical appearance. The pedicle was transfixed in several places and ligated with chromic catgut. The ureter was ligated separately. There was no hemorrhage during the operating. The operative recovery was uneventful, the patient did not abort and there were no signs of kidney insufficiency. During the first twenty-four hours following the operation 24 ounces of urine were collected. On the second day 40 ounces were passed and this remained the average daily output during the period of observation. The patient was discharged in excellent condition on February 16, 1913, the wound having closed save for a short sinus in the upper angle. The pathologist reported that the condition was that of multiple septic infarcts of the kidney, or the so-called unilateral hematogenous infection as described by Brewer. A pure culture of staphylococcus was isolated. About six weeks after leaving the hospital the patient was readmitted as her physician feared an infection of the left kidney. A careful study of the urine and temperature failed to reveal any signs of further infection and after remaining in the hospital for a few days she was discharged, and referred to her family physician. The wound was entirely closed. Her family physician reported that on May 15, 1913, which was about the end of the eighth month of her pregnancy, he induced labor and the delivery was effected without trouble. A few days before the induction of labor the patient was restless and slightly jaundiced. She complained of itching of the skin and of insomnia. On account of these symptoms labor was induced. At the present time both mother and baby were in perfect health.

DISCUSSION.

DR. L. FRIEDMAN asked if the ureters had been catheterized.

DR. GEORGE GRAY WARD, JR., said that it was astonishing how much one could do in these cases without bringing on abortion and he did not see why a nephrectomy should produce such a result. There were a great many operations that were done on the pregnant uterus without causing an abortion.

DR. HARRIGAN replied that the patient was so ill and the kidney infection so apparent that it would have been a waste of time to catheterize the ureters.

A SIMPLE FORM OF PERINEAL RETRACTOR.

DR. ADOLPH REICH presented this instrument. It was made of phosphor bronze wire, No. 10 and No. 13, with a spring in which

the resiliency could be adjusted. The sharp points pull the parts in a horizontal plane; two small copper washers were fastened a few lines from the points to prevent any tearing of the tissue. The sharp points of the retractor are introduced just above the last caruncle or where the highest point of denudation would be. The vulva is held apart by the retractor, producing a satisfactory exposure of the rectocele. A pair of artery forceps may be clamped to the median line at the mucocutaneous junction at the lowest point which retracts the skin posteriorly. The retractor had been found to be useful in Goffe's cystocele and prolapse operation. If the rectocele was in the way a self-retaining posterior retractor may be used in addition. In inguinal hernia it can be also employed, the operation being then completed by one person without any assistant. The principle may likewise be applied in the construction of abdominal self-retaining retractors. After forceps delivery this retractor affords the best exposure of parts. If the woman is in bed the spring end of the retractor should be turned up toward the symphysis pubis. The advantage claimed for the retractor was that it was simple in construction, self-retaining, and not expensive.

CHORIOEPITHELIOMA UTERI WITH VAGINAL METASTASES.

DR. M. CATURANI reported this case. The patient was twenty-seven years of age, and menstruated at the age of fourteen, the flow being of the four-day, irregular type. She had been married six years and had three children, the last two years previously.

She had been operated upon for hydatid mole, after four months of amenorrhea, in February, 1913, at the Italian Hospital. In March she had slight irregular bleeding and then was amenorrhoeic for three months. At the end of June she had a severe hemorrhage with abundant passage of clots. At that time she was again admitted to the hospital in a markedly anemic condition. She had had fever, preceded by chills and very offensive bloody discharge. The uterus was not considerably enlarged, was moderately contracted, and did not admit the examining finger. The case at the time was considered as one of incomplete infected abortion.

Without anesthetic, after moderate dilatation of the cervix by means of a holder forceps with a small sponge the speaker had removed a few pieces of apparently necrotic placental remains. The uterine cavity was lightly packed with a strip of gauze saturated with strong tincture of iodine. No pathological examination was made of the tissue removed.

The patient improved, the temperature dropping to normal and the discharge ceasing, though the anemic condition was persistently marked.

After a few weeks a small nodule of a dark color appeared on the vestibule and this was removed and sections were examined, when it was found that the condition was that of chorioepithelioma. Another vaginal metastases soon formed in the posterior fornix.

Hemorrhages, marked edema, dyspnea soon appeared and the patient died, probably from general metastases, with marked pulmonary and cardiac insufficiency on August 18, 1913. At no time could a radical operation have been considered possible. The post-mortem uterus was presented.

The special point in the history was the amenorrhea, which followed the removal of the hydatid mole. There was a similar occurrence in another case previously reported to this Section.

Dr. Caturani said he felt inclined to believe that in all probability in this and in the other instance mentioned, the patient did not conceive after the mole was removed. The amenorrhea could possibly find an explanation in remains of the mole left in the uterus being sufficient to influence the ovarian function, as a fetal structure in evolution, since following the delivery of the mole the patient's condition was good. This fact would be of great importance from the clinical viewpoint.

Amenorrhea, as well as metrorrhagia, after expulsion or removal of a mole should be carefully watched, as possibilities of molar remains, which in the successive evolution might give origin to chorioepithelioma.

Pathologically the different sections of the original uterine tumor and of the metastases showed the characteristic typical structure of chorioepithelioma. Irregular diffuse groups of Langhans' and syncytial cells were present in all sections, but there were no villi present. The fact was worthy of note that the uterine curettings were made up mostly of Langhans' cells; in the metastases the syncytial cells were relatively numerous, but there were more in the vulvar than in the vaginal sections.

LANTERN DEMONSTRATION OF SPECIMENS FROM A CASE OF SALPINGITIS NODOSA.

DR. M. RABINOVITZ said that the condition known as adenomyosalpingitis or, as some termed it, salpingitis nodosa had received practically no attention in this country, probably because the malady was more of pathological than of clinical interest. Conflicting views regarding the character of the lesion might be grouped into three classes, viz., that which holds the condition to be inflammatory in origin, that held by v. Recklinghausen and his school which assumes a congenital origin due to misplaced embryonal remnants, and a compromise between the two. Chiari's studies stimulated many investigators to search for additional corroborative evidence and prominent among his supporters might be counted Martin, Orthmann, Werth and Shauta. In 1896 v. Recklinghausen published his ingenious treatise entitled "*Die Adenomyome und Cystadenome des Uterus und Tubenwandung*" in which he attempted to completely overthrow the inflammatory theory, and enunciated the congenital origin of "salpingitis nodosa." The foundation upon which v.

Recklinghausen built his theory was based on the following data: A. It was a well-known fact that in early fetal life, as soon as the Wolffian body and its canal appeared, the Müllerian duct approached the Wolffian canal, then crossed it, and finally assumed a lateral position. At this crossing point, which was at the isthmical portion of the tube, the epithelium of the Müllerian duct came into so close a contact with that of the Wolffian canal, that a confluence of tissues readily took place; hence the possibility of Wolffian remains occurring in the tube wall. To support this view he described minutely these adenomatous spaces as being composed of secreting tubules, collecting tubules, terminal tubules and pseudoglomeruli, all morphological components of the normal Wolffian body. B. The noncommunication of these gland spaces with the tube lumen, showing that they were not derived from the tubal mucosa. C. The presence of yellow bodies or pigmented cells in the lumina of these tubules, mainly the secreting tubules, which according to Mihalkovics, Tournoux, Balantyne, Williams, and Czerny were constituents of the ep- and paroöphoron. D. The ciliated character of the columnar epithelium lining the adenomata. This ciliated epithelium according to Czerny was found in the tubules of the organ of Giraldes in the newborn sucklings, but disappeared with the advance in growth, and was wanting even in the freshly examined adult specimens. Waldayer and Orthmann claimed that only the middle portion of the tubules contained ciliated epithelium, while the collecting and the secreting tubules were devoid of it. Frey and Krause, on the other hand, described the epithelium lining the organ of Giraldes as squamous in nature. E. The difference in the staining properties between the epithelium of the tube and that of the gland spaces, the former presenting a deeper hue, the latter a much lighter color, which was peculiar to fetal tissue, hence the probability that the adenomatous spaces were of embryonal origin. F. The comparative rarity or the total absence of adenomyomatous changes in the cervix uteri was claimed as further evidence in favor of the congenital origin. He reasoned thus: Why should the cervix uteri, which under normal conditions was so abundantly provided with large glands, be free from adenomyomatous proliferations, while the fetal mucosa, which was ordinarily a glandless structure, be capable of giving rise to glandular metamorphosis? These were the salient points adduced by v. Recklinghausen in support of the congenital origin of "adenomyosalpingitis."

The cases were arranged into two main groups. A. Those in which the adenomatous changes were limited chiefly to the mucosa. B. Those in which the glandular proliferation had extended to and beyond the muscular coats, thus constituting the true picture of adenomyosalpingitis.

Following the projection of twenty-six microphotographs upon the screen, Dr. Rabinovitz offered the following conclusions: 1. Adenomyosalpingitis (salpingitis nodosa) was inflammatory in origin. 2. It was one of the final stages of microbic infection of the Fallopian tube. 3. The most common microbic infections were the gonorrheal

and the tuberculous; in a series recently reported the proportion was as four to one. 4. The theories that adenomyosalpingitis was a congenital or a blastomatous process, had thus far received no substantiation. 5. The term adenomyosalpingitis best expressed the pathogenesis of this lesion and should be generally adopted.

DISCUSSION.

DR. HERMAN GRAD said that the microscopic illustrations that Dr. Rabinowitz presented had not convinced him that they showed anything of an adenomyoma of the tube. They showed to his mind the microscopic picture of a chronic salpingitis where the congenital folds of the mucous membrane of the tube had become adherent to each other, giving the appearance of glands. The oviducts had no glands. The open spaces shown on the slides which were outside the muscular wall of the tube were uterine glands and he was fortified in his contention by the fact that the microscopic sections were made through the interstitial portion of the tube. The sections of the tube that were made through the isthmus and ampulla of the tube did not show these glandular structures.

DR. M. RABINOVITZ in closing the discussion said that: Dr. Grad's conception of the pathology of adenomyoma was apparently not clear, for otherwise he could not have made the assertion that the sections presented, simply show the ordinary changes of chronic salpingitis, that the gland-like spaces in the tube wall are prolongations of uterine mucosa, and that some of them are tubal diverticulæ or accessory tubes. I would ask Dr. Grad to read' through my paper on the "Pathogenesis of Adenomyosalpingitis" and he will be convinced of the unsoundness of his criticism. I merely wish to state that the lesions in the tubes presented this evening, correspond in all particulars and details to the pathological changes described under this heading by authorities like R. Meyer, Morten, Werth, Moresh, etc.

OVARIAN PREGNANCY WITH REPORT OF A CASE.*

DR. MICHELE CATURANI read this paper.

DISCUSSION.

DR. HERMAN GRAD said: The doctor has made a very careful report of this case of ovarian pregnancy and he is to be congratulated on this very interesting work which required so much labor. The question resolves itself in speaking of ovarian pregnancy, whether Webster's hypothesis is, or is not correct. Can the impregnated ovum engraft itself on anything else but tissues of Müllerian ducts.

*For original article see page 409.

If not, then it is not possible that "rests" of epithelial cells may become dislodged in the ovary and the fecundated ovum engrafts itself on these "rests" and in turn these displaced cells themselves become destroyed by the trophoblasts, leaving no trace of their former existence. In this way we could explain an ovarian pregnancy based on the hypothesis of Webster, or perhaps the connective tissue of the ovary is capable of reacting toward a fecundated ovum in a way as to favor its imbedding.

DR. M. RABINOVITZ said: Dr. Caturani has certainly presented a very interesting specimen and his paper has covered the literature on ovarian pregnancy most thoroughly. The etiology of ovarian pregnancy offers a wide field for speculative and theoretical reasoning, but we must not lose sight of the clinical fact, that most of these cases give a history of preceding inflammatory affections of the genital tract. I am, therefore, inclined to believe that the most potent factor in the etiology of ovarian pregnancy is a preceding perioophoritis causing a thickening of the germinal layer and thereby preventing the escape of the impregnated ovum.

TRANSACTIONS OF THE WASHINGTON OBSTETRICAL AND GYNECOLOGICAL SOCIETY.

Meeting of May 9, 1913.

The President, DR. SPRIGG, in the Chair.

DR. J. WESLEY BOVÉE presented a specimen, radiograph, photograph and history of a case of

MUMMIFIED, ADVANCED ABDOMINAL PREGNANCY COMPLICATED BY UTERINE FIBROMATA.

The history was as follows: E. W., colored, married, twenty-five years of age, was admitted to Columbia Hospital April 28, 1913. She had had one child after a normal labor and three miscarriages from unknown causes. Her menses had been established at the age of fifteen years, usually lasted three days, occurred every twenty-eight days and were moderate in amount and very painful. She had had the usual diseases of childhood from which she had made good recoveries. She declared she had never missed periods except with the four pregnancies mentioned and in each of them she had passed and seen a fetus and after-birth.

In November, 1912, she was admitted to the obstetrical service

of the Columbia Hospital for Women and Lying-in Asylum, with a history of having missed an indefinite number but several periods.

She had felt fetal movements for about two weeks and had just begun to notice a tumor in the abdomen. Bleeding and intermittent pains had been present for about two days. She was treated in the hospital for threatened abortion and discharged two weeks later as the symptoms had disappeared. At that time the patient was told



FIG. 1.—Radiograph of abdominal fetus of six and a half months.

she had a tumor for the removal of which an operation might later be necessary. It appears that four weeks after her dismissal the symptoms returned and before she could arrange to return to the hospital she passed a fetus about a foot long and a placenta.

From that time until April 24, 1913, she had no symptoms other than dull pain at times in the lower abdomen. On that latter date she had a sudden profuse uterine hemorrhage with severe pain and

four days later reentered the hospital, being admitted to my service on the gynecologic side. The next morning by examination a hard nodulated mass apparently movable in all directions independent of the uterus was found reaching from the pubes to an inch above the umbilicus. There was also a small umbilical hernia. An abdominal incision was made and through it a fibroid uterus was found and above it the mass mentioned, which was adherent to the anterior left lateral walls and to the intestines and omentum as well as to the left Fallopian tube. This mass was found to contain a fetus and placenta all of both of which was hidden from view except the sole of the right foot. The feet were in the lower right quadrant and the



FIG. 1.—Right side of six and a half months abdominal pregnancy. (Lying posteriorly in mother.) *A*, Left eye. *B*, Placenta.

head in the lower left quadrant opposite the umbilicus and adherent to the parietal peritoneum anteriorly. The intestines were attached to the fetal legs, buttocks, abdomen and head, the remainder of fetal surface being attached to omentum and mesentery. The intestinal loops were curiously intertwined with the lower extremities of the fetus. The placenta appeared to be in the outer end of the left Fallopian tube, 3 inches long and 2 inches broad and was fastened to the right anterior surface of the torso as if being hugged by the right

arm, reminding one of a football player holding the football under his arm. The tube from the placenta to uterus was long and slender and vermiform. The left ovary was quite cystic and adherent. The tube was lost in the placental sac as mentioned. Its fimbriated end together with some exposed mucous membrane at that point was thought to be distinguishable. The right ovary was small and cystic. Two small fibroids were found in the uterus and both appendages with the body of the uterus were removed. The uterus was $3\frac{3}{4}$ inches deep.



FIG. 2.—Right side of six and a half months fetus. (Lying anteriorly in the mother.) B, Placenta. C, Fimbriated end of left tube. D, Head.

The fetus was apparently a male weighing 1152 grams. The occipitofrontal diameter of the skull was 12 cm. and the biparietal 8 cm. The length of the fetus if extended would be about 32 cm. The spine is curved forward and to the left. The right arm and left foot seem to be clasping the placenta to the body, the left arm appearing to be relaxed and lying in the mother's abdomen.

The sole of the left foot is in apposition with the right internal

malleolus The whole specimen was covered with a semitransparent fibrous membrane but the features are concealed by the mass of placenta. The hair on the head was about as abundant as in the full-term fetus. The color of the fetus other than the hair was that of ivory and the other tissues could at any place be slivered up from the bone and appeared the same throughout, both in color and consistency. It was not until a radiograph was made that the bone was differentiated and the specimen found to be a mummified fetus and not a lithopedian. The woman made an uninterrupted recovery. The report of the Army Medical Museum, custodian of the specimen, is as follows: "July 10, 1913.

14332 Contributor, Dr. J. Wesley Bovée, Washington, D. C.

Ectopic pregnancy—Fetus Mummified.

Fetus mummified; measures from vertex to heel 32 cm., the length corresponding to a normal fetus at six and one-half months; some nails attain the end of the digits, others do not; fontanel closed; right ear rudimentary; left ear, eyes, right forearm and hand, and external genitals not recognizable; right thigh thickened in the middle; left leg dislocated backward; feet deformed and adherent to each other. Placenta mummified."

If Hasse's rule (Cunningham's Text-book of Anatomy, third edition, p. 68) be applied viz.: "After the fifth month of intrauterine life the length of the fetus in CMS. equals the age in months multiplied by five," the age would be six and two-fifth months. This is quite in accord with the tables of Cunningham (*loc. cit.*) and of De Lee (Obstetrics, 1913, p. 56). There is apparently no obtainable information or data relative to time necessary to mummification of a fetus. There is in this case no data bearing directly upon the beginning of an ectopic pregnancy nor upon its conduct while in the body of the mother. As no known pregnancy occurred without expulsion from the uterus of both fetus and placenta we may reasonably assume one of her several pregnancies was multiple—uterine and extrauterine. It is unfortunate that the history throws no light on the time of ectopic conception for such data would assist in determining the amount of time requisite for mummification to occur.

Dr. Bovée called attention to the greater importance of isthmic pregnancies over other tubal pregnancies because of the larger vessels and greater hemorrhage. Cases of ectopic pregnancy occasionally progress without morbid symptoms and recover without operation. The bad results with the vaginal operations in these cases made him prefer the abdominal approach notwithstanding the views of others.

DISCUSSION.

DR. CARR said that many cases ruptured without severe symptoms of shock or hemorrhage and without much pain. Such cases were easily confounded with acute salpingitis and the history of uterine bleeding was important in differentiating the two conditions.

DR. VAUGHAN had seen a case of ectopic pregnancy with jaundice, pain in the region of the liver, and a diagnosis of gall-stones had been made. Operation had disclosed the omentum adherent to an unruptured tubal pregnancy. In another case of a colored girl the diagnosis of appendicitis had been made and the tubal pregnancy removed through the gridiron incision. He preferred the abdominal route and immediate operation in every case.

DR. MILLER presented

A CASE ILLUSTRATING THE INADVISABILITY OF OPERATING FOR SYMPTOMS AND FOR THE MENTAL EFFECT, UPON NEUROTIC PATIENTS.

DR. WHITE presented

A CASE OF NOMA IN A CHILD.

DR. SULLIVAN read the essay of the evening on

THE CLINICAL ASPECTS OF RUPTURED TUBAL PREGNANCY.*

DR. LAWSON had seen two cases of expulsion of complete decidual casts of the uterus. In the more recent case there had been no evidence of extrauterine pregnancy. In sectioning the decidual cast the knife opened a small cavity containing a very small fetus, showing the case to have been one of normal uterine pregnancy and abortion with complete casting off of the decidua and ovum intact.

DR. WHITE thought that the gynecologists should use transfusion of blood more often in these cases rather than the older infusion of salt solution.

DR. BOVEE said that the important point brought out by the essayist was the importance of examining every woman thought to be pregnant who presented even slightly abnormal symptoms. The etiology of ectopic pregnancy was one of tubal obstruction, and the division into the inflammatory and the mechanical obstructions was only an artificial one as the inflammatory conditions only acted by producing mechanical obstruction. Many cases of ectopic pregnancy develop after so-called conservative work on inflammatory conditions in the tubes. There have been reported so far sixteen such authentic cases.

DR. FREMONT SMITH called attention to the difficulties in the diagnosis of ectopic pregnancy and referred to one case in the wife of a physician who had pain in her right side. The husband considered the case one of appendicitis; Dr. Fremont Smith concurred in the diagnosis. Dr. Robert Abbe was asked to see the case and agreeing in the diagnosis operated and found an ectopic pregnancy.

DR. LOWE suggested that in suspicious cases the serum reaction of pregnancy might be tried. In the cases of broad ligament rupture the extensive shock seemed to be due to the separation of the folds of broad ligament and not to the hemorrhage.

* For original article, see page 265.

REVIEWS.

MANUAL OF OBSTETRICS. By JOHN OSBORN POLAK, M.Sc., M. D. With three color plates and 119 illustrations in text. New York and London. D. Appleton and Company, 1913.

DR. POLAK has written a most excellent brief manual on the essential facts and principles of obstetrics, which will serve as a systematic introduction to the more elaborate treatises and as a guide in following a college course in obstetrics. The author is particularly well qualified for this task by his extended experience in teaching at the Long Island Medical College, and likewise his large personal experience as an operator in hospital practice. The work is issued in a very compact form for use by the student and the arrangement of topics is very convenient. All detailed descriptions of operations are omitted and the essential facts placed in italics when necessary. Particular attention may be directed to the chapters on the pathology of labor which afford an excellent idea of the various abnormalities connected with this process. The book may be recommended to students as a very excellent manual for practical use.

THE DIFFICULTIES AND EMERGENCIES OF OBSTETRIC PRACTICE. By COMYNS BERKELEY, M. A., M. D., B. C., CANTAB., F. R. C. P., LOND., M. R. C. S., ENG. AND VICTOR BONNEY, M. S., M. D., B. Sc., LOND., F. R. C. S. ENG., M. R. C. P. LOND. With 287 original illustrations. Philadelphia, 1913. P. Blakiston's Son & Co.

The above work may be compared to those of a similar character which have been issued in German of which the manual of Dührssen is a conspicuous example. The book here noted, however, although apparently much more extended by the aid of illustrations and large type, does not apparently afford any greater amount of information. The authors offer it as a practical guide to the practitioner when he is called upon to deal with the difficulties and emergencies that attend obstetric practice and for this reason, a manual in smaller form, suitable for the pocket, would it seems, be more efficient. The only work in English with which the present one may be compared, is that recently brought out by Dr. E. P. Davis of Philadelphia, which in its scope is of a similar character.

Berkeley and Bonney's book includes in its 750 pages, a description of practically all the abnormalities of pregnancy and the puerperium. The title of the book is perhaps somewhat "alarmist" in character and although obstetrical practice has undoubtedly a sufficiency of this element, there are many aberrations from the normal state which can scarcely be dignified by either terms em-

ployed in the title of the book. A great deal of information is nevertheless presented. Attention may be called to a few of the important features. In the description of eclampsia, the statement that the postpartum variety of the disease is the least dangerous, may be questioned. One is also surprised to find chloroform anesthesia recommended for operative measures during eclampsia, although its dangerous after-effects have been conclusively proven by many observers. Otherwise the treatment recommended is fully in accordance with accepted ideas on the subject.

One of the most interesting chapters in the book deals with insanity in association with child-bearing. It is ably discussed by Dr. Hubert Bond, who does not believe that mental disorders occurring during pregnancy or the puerperium exist as entities and that none of them possess any specific set of mental symptoms by which they can be identified. Pregnancy, labor, and the puerperal state must be regarded simply as examples of the numerous stresses, mental and physical, which under certain conditions not yet fully understood, may precipitate an attack of mental disorder. Bond states that all mental cases during child-bearing can be practically classified in two groups. In one, the less probable group, may be included incipient general paralysis, epileptic insanity, the earlier stages of paranoia, and the alcoholic insanities, which while possibilities, can usually be eliminated. In the next group, dementia precox, alternating and confusional insanity, include the majority of cases of insanity in association with child-bearing. The diagnosis and treatment of these various conditions are described in a most satisfactory manner.

Successive chapters deal with the various organic disorders and considerable space is devoted to the question of hemorrhage, complicated labor, puerperium and obstetric operations. The diseases and injuries of the new-born child are also discussed in a succinct manner and a chapter is devoted to the artificial feeding of infants.

In a book otherwise of so favorable a character, one is rather surprised to find frequent reference made by the authors to a variety of proprietary preparations and in one instance a well-known foreign proprietary drug is recommended in the treatment of pelvic adhesions. The proof reading is also to be criticised, a considerable number of errors having been noted, or else these are English idioms which sound strange to us. Thus "puerpery" is frequently made use of as a term descriptive of the puerperal state. Aside from the criticism directed to its size and form, the book probably fills the wants of English students and practitioners for a work of this kind. It is to be hoped that the indiscreet references to proprietaries will be excluded from future editions.

THE STUDY OF EXPERIMENTAL CANCER. A Review. By WILLIAM H. WOGLOM, M. D. Assistant Professor, Columbia University, assigned to Cancer Research. Sometimes Assistant to the Director of the Laboratories of the Imperial Cancer Research Fund, London. Illustrated with many plates. In two bindings, quarto, boards,

or 8vo, cloth, pp. xi+288. Volume I of *Studies in Cancer and Allied Subjects*, conducted under the George Crocker Special Research Fund at Columbia University. New York: Columbia University Press, 1913. \$5.00, net.

The importance of correct and thorough reviews of the literature on malignant growths has led the author of the above-mentioned volume of the George Crocker Fund publications to compile the enormous material on this subject from the earliest historical time up to 1913.

The illustrations given in this review by Dr. Woglom are taken exclusively from the Imperial Cancer Research Institute in London. The article deals with this many-sided problem of modern research most impartially and clearly.

Dr. Woglom gives first a historical review of the recognition of cancer in human beings, its significance and symptoms in the times before Schwann and Schleiden discovered the cellular structure of tissues. The many hypotheses regarding the origin of malignant tumors follow, with especial reference to Cohnheim's famous theory and the many exceptions to be taken from it, especially the Kangri Cancer, as described by Bashford. The largest part of the work however deals with experimental cancer in animals, such as the transmissability of malignant growth into animals of the same species and into animals of types and species different from the original carrier of the growth. Mammary carcinoma of the mouse plays by far the most important rôle in all the experimental work on tumors. Malignant growths have been found in almost the entire animal kingdom. The study of the original tumor, its metastases in the different stages, its transplants in other individuals of the same species, all offer possibilities of knowledge which will ultimately help to combat the disease. The study of biological rather than morphological peculiarities marks a great advance in cancer research. Of greater importance is Jensen's communication in the *Centralblatt für Bacteriologie*, 1903, xxxiv, 28, 122. In this paper are the first extensive studies of a primary growth of the mamma in the mouse and its transplantation into other mice. This and Loeb's sarcoma of the thyroid in a white rat transmitted by inoculation, seems to have started great activity among the investigators of experimental cancer. It has been shown that these neoplasms of the mouse are entirely comparable to those of man in every histological and morphological regard. Hereditary influence, hypo- and hypersusceptibilities for the tumor or its causes have been extensively studied by numerous investigators especially by Bashford, Murray, Cramer, Ehrlich, Apollant, Jensen, Halland, Borell, Loeb, Flexner, Woglom and Gaylord. It has been shown that cancer is more readily transplantable into the animals of the species in which it arose than in other species. No certain immunity nor cure has been obtained by the experiments on animals. Since many animal tumors disappear without therapeutic measures it is argued by many investigators that there is an inherent difference between experimental tumors and malignant growths in man. The Institute in Frankfort under

the direction of Ehrlich has advanced the hypothesis of arthrepsia. The main feature of this is that the cells of the organism into which a tumor is transplanted have to furnish a certain x -stuff in order to allow the growth of the transplant. The transplant which did not grow in an inoculated individual of a foreign species will grow again in the original species, thus showing that the tumor received certain food stuff, so to say, which kept it alive, but proliferation occurred only in the presence of the specific x -stuff necessary for the further development.

Ehrlich observed the development of a sarcoma together with the carcinoma in a mammary carcinoma transplanted into a mouse. The sarcoma was derived from the transplanted stroma.

Although many facts and hypotheses brought out by cancer research workers are not clearly understood and are even contradictory in some instances, the value of attacking the problem by the methods in use is clear and the hope of developing therapeutic measures is far better by these scientific studies than by the empirical methods of former times.

Dr. Woglom's review is a valuable guide for the student in cancer research since it contains abstracts of almost all the important investigations up to date.

E. SCHWARZ.

STUDIES IN CANCER AND ALLIED SUBJECTS. *From the Departments of Zoology, Surgery, Clinical Pathology, and Biological Chemistry.* Conducted under the George Crocker Special Research Fund at Columbia University. Volume III. Illustrated with many plates. Quarto, boards, pp ix+308. New York: Columbia University Press, 1913.

This volume presents the reports of the departments of Zoology, Surgery, Clinical Pathology and Biological Chemistry. It comprises thirty-three distinct papers covering a wide range of subjects. The zoological report under the direction of Dr. Calkins is concerned with studies of regeneration and cell division and the effects of mutilation in simple forms of life, the growth of tissue under experimental conditions, the relations of tumor growth to age and sex, inoculation experiments, the effect of irritants, and the relation of internal secretions on malignant tumors.

The department of surgery presents papers on the development of the chick blastoderm *in vitro*, and on a rare canine tumor.

The Clinical Pathological department has papers upon resistance produced in mice against transplanted cancer by inoculation of spleen and subcutaneously. The cells of an animal, whether normal cells or neoplastic cells, have a pronounced individuality when compared with the cells of another animal of the same species. This fact opposes to the cure of cancer an obstacle as yet unsurmountable.

The department of Biological Chemistry is concerned with methods for the diagnosis of cancer, the tryptophan test, the glycytryptophan test, and the colloidal nitrogen of the urine. Dr. Weinstein concludes that the tryptophan test is a valuable sign in the diagnosis of gastric cancer. It is a sign in itself, unlike the absence of hydro-

chloric acid and presence of lactic acid, occult blood and coffee grounds which appear in conditions other than cancer. Drs. Samford and Rosenbloom in a critique of Dr. Weinstein's paper are unable to agree with him that the tryptophan test is reliable for gastric carcinoma.

The proportion of colloidal nitrogen in the same urine of carcinoma is always higher than normal and it is probable that this new test may prove an aid in diagnosis. The next group of papers concerned transfusion experiments. Intravascular agglutination can occur and is the probable cause of occasional untoward symptoms. In the majority of cases it does not occur, dependent upon concentration of the agglutinin, its absorption or interference by nonagglutinable cells.

If for a given transfusion of nonagglutinative donor cannot be obtained it is safer to use a person whose serum is agglutinative toward the patient's cells than one whose cells are agglutinated by the patient's serum. Tests for agglutination and hemolysis should be made before transfusion. Agglutinable cells when transfused are taken up by the phagocytes in the patient's blood and can be expected to do little permanent good.

A very remarkable blood picture presenting many of the morphological forms peculiar to pernicious anemia is produced when the blood of another animal of the same species is destroyed in the circulation. The changes are due to some toxic effect on the bone-marrow. The last series of studies is upon the lipins which are receiving more attention as we gain knowledge of cell dynamics. A proposed classification is given and their diffusibility studied.

The final paper is on the influence of cancer extracts on lupin seedlings. The extracts failed to inhibit growth. This was an endeavor to find the toxine which produces cachexia. It has been impossible to show the occurrence in cancer tissue of any substance that would account for cachexia.

L. W. STRONG.

A TREATISE ON THE DISEASES OF WOMEN FOR STUDENTS AND PRACTITIONERS. By PALMER FINDLEY, B. S., M. D. Illustrated with 632 engravings in the text and 38 plates in colors and monochrome. Lea & Febiger, Philadelphia and New York: 1913, Price, \$5.00.

Dr. Findley's well-known book on the "Diagnosis of Diseases of Women" has served as a basis for this more extended manual. It may be said that the latter is as valuable and satisfactory as the former book. The author considers very fully every phase of gynecology and the closely related obstetrical conditions. The nonoperative methods of treatment receive their due share of consideration and the subject of diagnosis has been placed on an anatomical basis both macroscopic and microscopic. The author divides his book into thirty-four chapters and one of the few faults to be found with the same is the confusion which may result from the overlapping of certain subjects. Thus the subject of hemorrhage is discussed in various distinctly separated sections and it might have been better to use the chapters on examination, hygiene, and similar subjects, as

an introduction to the book. Some unnecessary material has also been introduced as in the chapter on the examination of the blood—the histological description of the blood cells, etc., appear superfluous in a book of this kind, although the account of leukocytosis, anemia, etc., in relation to gynecological conditions, is of great practical value. The various methods of physical and instrumental examinations of the gynecological patient are described in a very complete and satisfactory manner. In common with American authors, however, Findley condemns or at best slightly dismisses the subject of dilating tents for diagnostic or operative purposes. If properly used, these contrivances are of undoubted value, and as now prepared can be used without fear of infection. Uterine curettage as a diagnostic measure is given its complete import, although one may question the advisability of swabbing out the cavity of the uterus with a full strength formalin solution as a routine practice. The author, however, seems very fond of this drug and refers to its use continually. Too much detail attaches to the preparation of specimens for microscopical examination. If a physician is desirous of acquiring this knowledge, he had better refer to the special works on the subject. An excellent table for the diagnosis of expelled membranes is included in this chapter. The author calls particular attention to the fact that decidual cells are hypertrophied connective-tissue cells, that this may be due to other causes than pregnancy and hence their absence should not be accepted as pathognomonic. He states very truly that the only positive evidence of pregnancy in discharged membranes is the presence of chorionic villi. The chapter on ectopic gestation is very complete and satisfactory and that on nonoperative methods of treatment is also very complete. The author again commends the use of glycerin and ichthylol in the form of tampons as depleting agents in chronic inflammatory pelvic states and believes that their true therapeutic value is not sufficiently appreciated. The malpositions of the genital organs are given extended consideration and their anatomy and treatment are very satisfactorily presented. In the description of the cystocele operation, the advice is given to do an amputation of the cervix where necessary after the colporrhaphy, contrary to the usual rule. Anterior fixation in the treatment of prolapse of the uterus is condemned. Shortening of the round ligaments or amputation of the body of the uterus with fixation of the stump to the anterior abdominal wall, according to the method of Baldy, is favored by Findley as the most satisfactory procedure. Vaginal hysterectomy, total abdominal hysterectomy and vaginal fixation are mentioned merely to be condemned. For the treatment of retroverted uterus, Todd-Gilliam procedure is preferred, although the Webster and the Baldy methods of intraabdominal shortening of the round ligaments are highly spoken of. The Simpson and Noble operations are favorably commented on, but the Alexander-Adams procedure, as in most modern text-books, is discriminated against.

In discussing the inflammatory conditions of the uterus, the author adheres to the term endometritis although acknowledging its faulty

character. Findley thinks that we must employ both a clinical and an anatomical classification for these cases, the former including the acute and chronic forms of the following varieties: hemorrhagic, catarrhal, dysmenorrheic, tuberculous, gonorrheal, decidual, puerperal, postabortive, exfoliative, and senile. The anatomical classification depends on gross and microscopic observations and that proposed by Ruge and Veit is followed. The microscope is essential in the diagnosis of all cases for then only can the presence of malignancy be determined or excluded, the clinical signs and symptoms being generally insufficient. A glandular and an interstitial form of endometritis may be also recognized although they are usually combined. The important subject of diseases of the Fallopian tubes and ovaries receives extended consideration. In answering the question as to the removal of the uterus in bilateral salpingectomy, the author believes that this organ should not be sacrificed in young women unless there is evidence of a deep-seated infection of the uterine musculature or when it contains other morbid conditions which in themselves call for hysterectomy. In discussing ovarian inflammations, Findley presents the results of his careful observations in 180 cases of cystic degeneration. He believes that this process is almost invariably the result of chronic ovaritis due to infection or passive congestion of the ovary and is therefore a morbid lesion. One or more ripened follicles must not, however, be mistaken for follicular degeneration. The symptoms referable to cystic degeneration of the ovary are, pelvic pain and tenderness, dysmenorrhea, sterility, and general nervous phenomena, the latter being probably due to the local discomfort. A chapter on general peritonitis is followed by one on pelvic cellulitis and a very complete description of gonorrhea. The author has already published a very practical manual on this subject. Tuberculosis of the genital organs and nutritional disturbances of the same are likewise fully considered. Fibromyoma of the uterus is accorded considerable space and the author directs special attention to the various forms of degeneration and the fact that fibroids are by no means the innocent tumors formerly believed. Expectant treatment is no longer countenanced by some gynecologists, although the strictly operative measures may become invaded by the success which has attended the use of radiation treatment in certain cases. Although in accord with the view that fibroid tumors need only be operated upon when symptoms arise, the author believes in the necessity of keeping them under very close observation. The subject of malignant disease of the uterus is considered from all viewpoints and likewise the tumors of the other genital organs. The diseases of the urinary system are very fully described and the concluding chapters are devoted to postoperative treatment and complications.

Dr. Findley's book constitutes one of the most complete works on gynecology which has been issued in recent years and shows painstaking care and study in achieving this result.

BRIEF OF CURRENT LITERATURE.

OBSTETRICS.

Value of Aberhalden's Test for Pregnancy.—This test was applied by H. Williamson (*Jour. Obst. and Gyn. Brit. Emp.*, 1913, xxiv, 211) for experimental purposes, in fifty patients. Of these, twenty women were either in the last three months of pregnancy or had recently been delivered. In each case the result was positive. Thirty women were not pregnant, in all thirty the reaction was negative. In sixteen cases the test was employed for diagnosis. In twelve of these the deduction proved correct; in two, wrong; in two it was still doubtful. The fact has been established that the serum of pregnant women contains a ferment specific to placental albumin. This ferment can be demonstrated from the eighth week of pregnancy until ten days after delivery. Its presence may be demonstrated by the polarimeter. The former method is the more reliable in that the sources of error are fewer. The accuracy of the test depends upon the most scrupulous care in details, and it is only in the hands of an expert that the results can be relied upon. The ferment is found only when chorionic tissue is present in the body. It is probable that under other conditions the color reactions and optical effects produced by the test may be simulated, but we have already detected most of the common sources of error, and in the near future the test may be expected to give reliable results.

Miliary Tuberculosis of the Placenta with Latent Pulmonary Tuberculosis.—The case recorded by A. S. Warthin (*Jour. A. M. A.*, 1913, lxi, 195) presented a placental miliary tuberculosis of a low virulence, the majority of the tubercles being in a healing stage. It is very probable that in the earlier months of pregnancy, most likely in the third or fourth month, a latent tubercle in the right apex became active, gave access to the blood of tubercle bacilli that lodged chiefly in the placenta, and produced there lesions that showed a tendency to heal. Medical examination of the mother showed a positive tuberculin test and a suspicious right apex, but no evidence of active disease. This report shows that even in the case of an unrecognized latent lesion in the lung of a pregnant woman tubercle bacilli may enter the circulation and produce a miliary placental tuberculosis. If this is possible it is also possible that under such circumstances the bacilli may pass the placenta and enter the body of the fetus.

Pituitrin Therapy.—H. F. Albrecht (*Alb. Med. Ann.*, 1913, xxxiv, 707) has used pituitrin in forty vertex cases. He concludes that it is a powerful stimulant to uterine contractions in labor, the latter nevertheless retaining its physiological character. Its best action is

in the second stage, where it is always harmless. It is of value in the first stage with sufficient dilatation of cervix and no obstruction, provided it is given in small doses, otherwise tetanus uteri may occur. Fetal heart beats may become slowed, but unless labor is too prolonged, they regain their normal character. The average dose is 1 c.c. and is usually sufficient. Repetition of dose is always as effectual as the first administration. Effect begins three to ten minutes after use and usually lasts an hour. Postpartum conditions are normal. The contraindications are but few. It is of value as a cardiovascular stimulant and shows beneficial results in amenorrhea, menorrhagia, and allied conditions.

Theory of the Cause of Ectopic Pregnancy.—O. V. Huffman (*Jour. A. M. A.*, 1913, lxi, 2130) has examined sixty-eight specimens of ectopic pregnancy and found malformations in 54 per cent. of them. He regards this evidence, besides the negative findings in regard to any obstruction or inflammation, as sufficient to warrant the establishment of his anomalous embedding area theory. He believes this to be the most logical explanation for ectopic pregnancy because it rests primarily on the mutual relation of fecundated ovum and embedding site. The theory of anomalous embedding area is not illogical like the inflammation theory; inflammation which is a recognized cause of non-embedding in the uterus, becomes, according to this inconsistent theory, an auxiliator of embedding outside of the uterus, nor is it illogical like the obstruction theory, according to which, if it were consistent, a fecundated ovum caught in the cervix uteri or vagina should go on and embed there.

Role of Ovarian Disease in the Production of Sterility.—From a preliminary study of forty-five cases, G. W. Kosmak (*N. Y. State Jour. Med.*, 1913, xiii, 638) concludes that in a certain proportion of cases the removal of an ovary which is diseased contributes to increased function in the other, as evidenced by an improvement in the menstrual conditions and the greater possibility of subsequent pregnancies. It would appear as if the question of sex was not dependent on the side from which the individual ovum is derived and that whether the left or right ovary is removed the proportion of sexes in subsequent children is about equal.

The Relation between Ovulation and Menstruation.—Schröder (*Arch. f. Gynäk.*, Bd. ci, Hft. 1) in an attempt to decide this question, has examined the ovaries and uterine mucosa in a series of 100 operative cases. He concludes that the development of the corpus luteum and the maturation and degeneration of the same are subject to periodicity similar to that which occurs in the endometrium. The different phases of this process may be compared to those which occur in the uterine mucous membrane. The relation between menstruation and the changes in the endometrium and corpus luteum are according to Schröder, as follows: (1) The menstrual history begins from the fifteenth to the twentieth day after the beginning of the flow, during which time the endometrium shows the characteristic changes of the middle or end of the interval; whereas the corpus luteum indicates the first stage in its development.

(2) That portion of the menstrual cycle included between the twenty-fourth and twenty-eighth days corresponds to the period of the flow, and complete development and organization of the corpus luteum. (3) From the first to the fourteenth day of the menstrual cycle, the endometrium shows postmenstrual conditions and the corpus luteum is degenerating. It follows that the ovarian follicle ruptures between the fourteenth and sixteenth day after the beginning of the flow in cases where the periods are regular and at intervals of four weeks. The rapid formation of the corpus luteum is normally associated with the premenstrual swelling of the mucosa and it is probably the cause for the change. These observations coincide with those previously made by Meyer and Ruge. It is evident, therefore, that the ovum in the last complete menstrual period is the one which has been fertilized.

The Patency of the Cervix at the End of Pregnancy.—Braude (*Zentralbl. f. Gynäk.*, No. 47, 1913) in view of the uncertain anatomical findings which designate the end of full-term pregnancy, refers to the patency of the cervical canal as unimportant evidence of impending labor. The question has been investigated in a large series of cases in which the time was noted when the cervix was first found dilated and this compared with the date of the final delivery of the patient. In a series of 180 primiparæ near term, the cervical canal was found open in forty-six. In twenty of the latter, from five to fifteen days and in nine women from sixteen to twenty-five days elapsed before labor. Among 263 primiparæ examined in the eighth to the ninth lunar month, the patency of the cervical canal was observed twenty-eight times. Of these there were ten in which from five to fifteen days elapsed before delivery, in five from sixteen to twenty-five days, in five from twenty-six to forty-five days, and in three women from forty-six to sixty-four days. Among 134 primiparæ examined between the seventh and eighth lunar month, the cervix was found latent in only four, in all of which it remained so for periods varying from seventeen days to sixty-five days. These statistics seem to show that even if the cervix permits the passage of the finger, this does not serve as a definite sign for impending labor in primiparæ. In the majority of these cases, pregnancy continued and extended to the calculated date.

Interruption of Pregnancy in Pulmonary Tuberculosis.—Werner (*Zentralbl. f. Gynäk.*, No. 43, 1913) presents the results of this method in a series of sixty cases operated on during the last two and one-half years at Wertheim's Clinic. The women were all multiparæ and usually had one or more living children. Active as well as inactive tubercular processes involving the lungs or the larynx served as indications for the interference. The pregnancy in this series varied from six weeks to five months. The operation consisted of cervical dilatation with tents followed by an incision of the anterior vaginal vault, separation of the bladder and longitudinal incision of the cervix to the internal os. The ovum was then separated with the finger and removed with forceps. The cervical incision was closed with silk or catgut and the peritoneum incised.

The adnexa could be readily delivered in most cases and the uterine portion of the tube was resected in the earlier cases and the entire tube removed in the later as being simpler. The peritoneal incision and that in the vagina were next closed and the prevesical space drained with a gauze strip. These operations were done under chloroform and the more recent ones with spinal anesthesia. The atonic hemorrhage liable to occur in these cases is best treated by injecting pituitary extract or ergotin previous to beginning the same. In a few cases uterine packing was required and in one instance the hemorrhage was so profuse that a vaginal hysterectomy was found necessary. The one death occurred in an advanced case of tuberculosis at the third month of pregnancy in which the severe hemorrhage which accompanied the incision of the cervix rendered necessary the abandonment of the remainder of the operation. The autopsy showed an extreme anemia with further hemorrhage from a laceration in the anterior wall of the uterus. The average convalescence was about nine days and the condition of the generative tract normal except in three cases where a slight exudate was present. One patient died four months after operation from pulmonary tuberculosis. Twenty of the women remained well and able to do their work but in four of the advanced cases very little improvement resulted in their general condition. The author believes that the conservative treatment presented is superior to laparotomy with the removal of the genitals for the reason that the convalescence from the same is very much reduced and the general condition of the patient is restored at an earlier period.

Repeated Attacks of Eclampsia in the Same Patient.—Holste (*Berliner klin. Wochenschr.*, No. 41, 1913) refers to the rarity of this condition and reports a case in which a patient was subjected to eclamptic seizures in four successive years, the last one ending fatally. In the first labor the delivery was hastened by dilatation with rubber bags and the convulsions controlled by hypnotics. In the next labor this method failed and delivery by version was necessary. This was repeated in the third labor but in the fourth no reaction to any of the usually employed procedures was present and not even the rapid delivery by cervical incisions was successful. The patient had been under constant observation but notwithstanding the prophylactic treatment, subsequently developed convulsions. At the autopsy an extensive bronchopneumonia with parenchymatous degeneration of the heart muscle and the liver was found. The kidneys seemed relatively little involved and no anatomical basis for the repeated attacks could be determined. As this patient showed a particular predisposition to the attacks, the writer believes that he would have been justified in sterilizing the patient had she survived the last attack.

The Effect of Disinfection on the Germ Content of the Puerperal Uterus.—Leidenius (*Archiv. f. Gynäk.*, Bd. c, Hft. 3) presents the results of his investigations in the clinic at Helsingfors in the following conclusions. By thoroughly disinfecting the genitals of a woman in labor, the number of bacteria in the birth canal is dis-

tinctly reduced and their migration into the uterus during the puerperium, diminished. The methods ordinarily employed have little effect in reducing the bacterial content of the puerperal uterus. An increased effect is obtained when the pubic hair is shaved and the vulva swabbed with tincture of iodine. By combining this procedure with a vaginal douche, the bacterial content is reduced even more than with simple disinfection of the vulva. In vaginal douches the mechanical factor is an important element, as irrigation with boiled water materially reduces the bacterial content of the uterus. A much better result is obtained with a mild antiseptic irrigation of peroxide of hydrogen, lysol, etc., the most efficient being a 0.5 per cent. lysol solution. The influence of this disinfection is the same on all varieties of bacteria and no differences were noted between primiparæ and multiparæ as regards the germ content of the puerperal uterus. For the reasons stated above, the author points to the necessity of thoroughly disinfecting the vulva during labor, and the value of a prophylactic vaginal douche is also unquestioned.

Laceration of the Umbilical Cord before Birth.—Nebesky (*Archiv. f. Gynäk.*, Bd. c, Hft. 3) states that in precipitate labor, the weight of the child may be sufficient to produce a complete rupture of the umbilical cord. In premature labors, the resistance of the cord is somewhat less than at full term, although this is in proportion to the development of the fetus. That third of the cord nearest to the fetus is particularly liable to laceration, whereas the median and placental segments are less so. The danger to the child in rupture of the cord is comparatively slight from hemorrhage if the respiration is started at once. There is very much more danger if the vessels are torn in cases where a velamentous insertion of the cord is present, and these are torn during labor pains before the child is born. It is apparently immaterial whether a spontaneous or an artificial rupture of the cord occurs. The labor pains may result in a total rupture of the cord if the pains are strong or a resistance is present. This is especially the case where the cord is absolutely or relatively shortened. The proportion of Wharton's jelly and the number of twists have no connection with the resistance to the tearing of the cord from precipitate labor or extreme pains. Umbilical cords with dilatation of the vessels or knots, are torn somewhat more readily than those which are normal. In a very few cases, rupture of the cord results without the causes previously referred to and these the author believes are due to the histological structure of the same. The umbilical cord may predispose to rupture if there is a lack of elastic fibers in the walls of the vessels, although this is a very rare occurrence. Much more frequently a histological change in the musculature of the vessels or a diminution in the connective tissue, or pathological changes, will result in a lessening resistance.

The Effect of Cranial Depressions of the New-born on its Development.—Gfroerer (*Zeitschr. f. Geb. u. Gyn.*, Bd. lxxv, Hft. 1) reports that at the University Clinic of Würzburg these cases are conservatively handled and the treatment is dependent on the

symptoms. A series of twenty-four cases has been studied by the author. Of these, seven died within the first few days after labor, and autopsy showed that in each instance the death was due to the cranial injury which was produced in every case by a pelvic deformity in the mother. Delivery in all of these seven cases was by version with breech extraction. Operative interference would not have been successful in saving the life of the child in any case. Among seventeen remaining cases discharged alive from the hospital, five died subsequently from various causes. A study of the mental condition of the remaining cases failed to disclose that this had been affected in any way by the cranial injury, and the author believes that uncomplicated cranial depressions in the new-born are therefore of comparatively little moment in the future history of the child.

Air Embolism in Labor.—Jlyn (*Arch. f. Gynäk.*, Bd. ci, Hft. 2) in referring to the conventionally accepted ideas as to the dangers associated with this condition, states that neither animal experiments or clinical observations show any basis for the same and that in all but exceptional cases, the danger is exaggerated. It is necessary in every case to subject the same to stringent analysis and examination, based on the same requirements, so that every autopsy in a patient supposed to have died of air embolism is carried out according to a definite and accepted scheme. All vessels going to and from the heart must be ligated and the lungs, together with the heart removed *in toto*. The cavities of the heart, pulmonary artery and its branches after having been carefully tied and all air bubbles on the surface removed, are then opened one at a time under water in a deep vessel. It should then be carefully noted whether the air escapes in the form of large bubbles or a foam. An examination of the lungs is also to be carefully conducted and a microscopical examination from various portions of the organs must be included.

The Prognosis of Kidney Disease in Pregnancy.—Jascha (*Arch. f. Gynäk.*, Bd. ci, Hft. 2) discusses this subject with special reference to women afflicted with cardiac disease. He believes that in every instance the association between kidney and cardiac disease is a serious complication and for this reason claims that in every case of renal involvement accompanied by hypertonicity, labor be induced as early as possible where a complicating cardiac lesion is present. He believes that it is only by reducing the work of the kidneys and heart together, that the patient is afforded any chance, although in isolated cases it may be possible to prolong the pregnancy under careful auspices. This is in contrast to the observation that cardiac lesions or diseases of the kidney occurring alone, do not necessarily render the prognosis in the individual case serious. In some cases it may be difficult to determine whether we are dealing with an ordinary kidney of pregnancy or a chronic nephritis. The transition from one form to the other is readily possible and a sharp distinction cannot always be drawn.

Influence of Pregnancy and the Puerperium on Mortality from Tuberculosis.—Tussenbrock (*Arch. f. Gynäk.*, Bd. ci, Hft. 1) has

studied the question as presented in the population of Amsterdam and several other Dutch cities and finds that the mortality in tuberculosis during the first half year of pregnancy is increased. During the second half year it is diminished, however, so that the two are practically balanced. She finds that the mortality from tubercular diseases during the year following pregnancy is equal to that of the general mortality from tuberculosis in adult women. It was also found that among married women, the mortality seemed to be reduced and the prevailing opinion that the death rate in tuberculosis is increased by pregnancy and the puerperium is not borne out by the results presented in this investigation, and that as based on these figures there is no general indication for the cessation of pregnancy in tuberculosis.

The Relation between Repeated Abortion and Internal Secretion.—Lehmann (*Arch. f. Gynäk.*, Bd. ci, Hft. 1) states that essential habitual abortion refers to the repeated interruption of pregnancy without a demonstrable cause in either mother or child. Various types of this condition may be described. It is worthy of note that male fetuses are in the preponderance and that many women abort only with male fetuses, while the females are carried to term. The author found good results in the treatment by the use of iron and potassium iodide. He believes that the administration of iron is successful not because it relieves any possible deficiency in the mother but because it manifests a particular effect on the genitals and their functions. The iodide probably acts by increasing the activity of the thyroid which undoubtedly fulfills a particular function during pregnancy. As regards the other glands with an internal secretion, Lehmann does not believe that the hypophysis takes any important part in the induction of labor as is usually attributed to the same. In the other glands there is insufficient evidence as to whether they undergo an increase or reduction in activity during pregnancy. The suprarenal capsules seem to present a partial hypertrophy. The ovary undergoes a hyperfunction but by the development of the internal secretion of the corpus luteum, partakes in the increased work of pregnancy. Lehmann believes that habitual abortion in women in whom no other definite cause is demonstrable, may be regarded as due to an interference in the activity of the individual secretory glands.

The Latent Period in Chorioepithelioma.—Polano (*Zeitschr. f. Geb. u. Gyn.*, Bd. lxxv, Hft. 1) believes that this form of malignant growth may be characterized by a latent period of considerable length in contrast to the assumption that in most cases the retention of certain histologic fetal elements is productive of early malignancy. From a study of a personal case and others gathered from the literature, he finds that a considerable latent period may intervene between the last pregnancy and the production of the malignant growth. We must assume therefore, that fetal elements in the female organism may under certain circumstances, remain in a quiescent state for a prolonged period, and that the maternal organism even if in a healthy condition, may be unable to get rid

of the fetal elements foreign to the body, so that these may remain for many years before becoming virulent and malignant.

The Etiology of Pyelitis in Pregnancy.—Weibel (*Arch. f. Gynäk.*, Bd. ci, Hft. 2) presents an extended series of serological and clinical observations on this subject from Wertheim's Clinic. He studied among other questions, the exact relation of the ureters in normal pregnant women by means of the cystoscope, and claims that the interference with the ureteral excretion in the course of the ureter is very frequent, even during normal pregnancy. The abdominal portion of the ureter is usually involved. Among 100 normal pregnant women examined, 40 per cent. of the primiparæ and 34 per cent. of the multiparæ showed definite interference in the ureteral flow. Weibel does not believe that the dilatation of the ureter which is often found is due to a swelling of its mucous coat or that a point of pressure is produced by the nearest portion of the fetus. On the contrary he claims that the congestion is due to the growth of the uterus itself and that the other conditions found, including the swelling of the mucosa, dislocation of the bladder, etc., are merely secondary. Pyelitis is essentially an infectious process resulting from an ascending or a lymphogenous process. The ascending path is more apt to be followed by those bacteria which do not come from the intestine, including staphylococci and streptococci, and an occasional colon bacillus. In the majority of instances where colon bacilli infection results, however, or infection by other intestinal organisms, the infection is either through the lymphatics or by direct transmission. The bacteria in the former instance are derived from the cecum and ascending colon through the posterior wall of which they find their way into the lymphatics without going through the serous coat. It has already been demonstrated that these lymphatics are directly related to those of the kidney. The migration of these organisms is favored by the pressure of the pregnant uterus on the neighboring organs, also by constipation and the accumulation of gas usually associated with pregnancy, and likewise the dilatation and paralysis of the pelvis of the kidney and the ureter. Although these organisms could be regarded as saprophytes while still in the intestine, they become pathogenic as soon as they find their way into the congested urinary stream. Although pyelitis may arise during pregnancy itself, there are many cases in which it is present before this begins, and although these may have been free from symptoms before pregnancy, these are readily lightened up by this process, so that even in those cases it may be regarded as pregnancy pyelitis. In view of the favorable prognosis in cases of pregnancy pyelitis, this process need not be interrupted and the correct treatment involves attention to the pyelitis only. Weibel claims that irrigation of the renal pelvis is much superior to any operative interference.

Lactic Acid Bouillon in Infection, Especially Puerperal.—René Beckers (*Bull. de la Soc. Belge de gyn.*, Dec. 6, 1913) describes the results of his studies of the use of a lactic acid bouillon in the treatment of puerperal and other infections. The culture is used by

ingestion and by pulverization, the latter especially in the otorhinolarynx. In operative treatment compresses of gauze are soaked in the bouillon, or injections are made. The gauze may be placed in the vagina, in the uterine cavity or both. Injections may be vaginal or intrauterine. In the uterus an injection of boiled water precedes the injection of bouillon. This culture has a marked bactericidal action; it acts on streptococci, colon bacillus, and various cocci. The lactic acid bacillus which is anerobic acts best on surface wounds, such as those of the perineum and vagina, and in fetid suppurations. The Bulgarian bacillus is the most efficient. It also causes leucocytosis. The fetid odor disappears at once; the temperature falls; supuration stops; gangrenous wounds clean, and cicatrization begins at an early date. In septic vulvovaginal wounds a simple compress saturated with the culture has an immediate effect, and cicatrization soon occurs. In endometritis the discharge become mucous and soon ceases. The culture is a remarkable deodorizer, a regulator of the temperature, and an agent of cicatrization. It has the advantage of doing absolutely no harm.

Treatment of Toxemias of Pregnancy with Placental Serum.—A. J. Rongy (*N. Y. State Jour. Med.*, 1914, xiv, 21) first observed that placental serum has a favorable effect upon toxemia of pregnancy in the course of an investigation of the effect of fetal serum upon the onset of labor. In this patient in addition to onset of labor brought about by the serum, all the toxic symptoms improved before labor actually set in. Realizing the possible therapeutic value of placental serum in late toxemia of pregnancy he decided to make use of it in the early toxemia, that of pernicious vomiting. Marked improvement occurred in four out of five cases in which it was employed.

Sero-diagnosis of Pregnancy.—The tests of N. D. Goodline, E. R. Arm and F. L. Kislig (*Ohio State Med. Jour.*, Jan., 1914, 6) include 108 possible pregnant conditions, the diagnosis of which was confirmed in all but seven cases. Among these were eighty-two cases of pregnancy, two of which gave negative results. One ectopic case that gave a negative result was operated upon and blood clots found in the abdomen. Excluding seven cases whose later history was unobtainable, and an ectopic which ruptured nineteen days before the test was made (the ovum had probably been dead for two weeks previous to the test and therefore a negative result was to be expected) practically 98 per cent. of positive results were obtained.

One hundred and five sera from individuals known not to be pregnant, thirty of which were from normal males and females, showed about 5 per cent. of positive results. The test simply reveals the fact that the individual from whom the serum was obtained harbors or has harbored within the body within a short time placental tissue. It will be found of great value in all cases of amenorrhea; in those where there is any opportunity for a pregnancy to exist; in the cases of nursing mothers who are not menstruating and where there is a suspicion of another pregnancy; in suspected abortion; medico-legal cases; suspected ectopics; and in the differentiation of pregnancy from new formations, such as tumors, cysts and cancers.

Eclampsia after Hysterectomy for Rupture of the Uterus.—Zweifel (*Zentralbl. f. Gynäk.*, 1914, No. 5) describes a case in which a para-iv, sent to the hospital on account of rupture of the uterus, was subjected to immediate complete hysterectomy. A few hours later an eclamptic seizure occurred which was succeeded by two others. The patient had suffered from considerable loss of blood and it was at first believed that her unconsciousness was due to the same. The writer shows that neither the acute anemia or the narcosis could have had any effect. An interference with speech resulted and lasted for seventeen days which can also be attributed to a cerebral lesion due to the eclamptic processes.

Sciatica in Pregnancy Treated with Ringer's Solution.—Barbey (*Zentralbl. f. Gynäk.*, 1914, No. 3) describes a case of sciatica which came on during pregnancy and kept getting increasingly worse up to the sixth month, which resisted all the usual forms of treatment. In the belief that the condition was of a toxic origin similar to the dermatoses which occur during pregnancy, the author employed subcutaneous injections of Ringer's solution of the following composition: sodium chloride 7.5, calcium chloride 0.2, potassium chloride 0.1, distilled water ad 1000 gm.; 20 c.c. of this solution was injected in the vicinity of the right trochanter. On the next day 30 c.c. was given in the popliteal space, on the third day 30 c.c. in the calf of the leg. By the fourth day a well marked improvement was noted, the pains were less and the leg could be freely moved. Another similar series of injections was given in the other leg with equally favorable results. In less than two weeks the patient was discharged entirely free from symptoms. In cases where the sciatica is due to pressure from the fetal head in the latter months of pregnancy or where it is due to other causes, the method is not applicable.

A Case of Triple Pregnancy in One Fallopian Tube.—Diamant (*Zentralbl. f. Gynäk.*, 1914, No. 3) reports a most unusual case of triple pregnancy in a single tube, of which abnormality only three similar instances are known. In the case reported, the patient a para ii developed signs of an ectopic pregnancy and was subjected to a laparotomy. A tubal pregnancy was found to have taken place, and after freeing the adhesions and clots around the ampulla of the right tube, three embryos each about 3 cm., long were found in Douglas' culdesac, having been aborted from the right tube.

The Dangers of Tamponade in Placenta Previa.—Reinhardt (*Zentralbl. f. Gynäk.*, 1914, No. 4) has analyzed a series of cases in Kehrer's clinic at Dresden including 276 cases of placenta previa, of which 115 had been previously tamponed. It was found that about 58 per cent. of the latter developed fever during the puerperium in contrast to 35 per cent. of those which had not been subjected to tamponade. Moreover, among six fatal cases of sepsis in this series, five had been tamponed. In calling attention to the apparent danger of this procedure the author questions the necessity of the same. It is probably only indicated in emergency cases with severe hemorrhage where the cervix is almost closed. He claims that tampons are unnecessary in the majority of cases, particularly where there

is only slight bleeding at the beginning of the period of dilatation. As the hemorrhage results from the vessels which are opened during the pains, an injection of morphine to reduce the strength of the latter should be given while the patient is transported to the hospital. Where the procedure is employed, the preparations should be fully as complete as for any case of labor.

Kidney Infection in Pregnancy.—Eckelt (*Ztschr. f. Geb. u. Gynäk.*, Bd. lxxiv, Hft. 1) presents a series of interesting observations made in Franz's clinic at the Charité in Berlin, in which the tests for kidney function employed in other diseases have been adapted to the examination of a series of cases of pregnancy. A careful study of the intake of water, salts, and a diet composed of milk and vegetables, showed that the kidney of a healthy pregnant woman is not to be distinguished as regards its functional abilities, from a healthy nonpregnant woman. The only difference seems to consist of an oversensitiveness of the vessels of the kidneys. Moreover, in the so-called kidney of pregnancy, insufficiency involves only the excretion of water and sodium chloride. This condition is not a nephritis in the narrower sense, but merely hydropygenous nephrosis. Observations conducted in a number of Eckelt's patients showed that the diminution of the sodium chloride trituration factor seemed to point to an approaching eclampsia seizure. This symptom can only be applied in a practical fashion with difficulty because it would require a continuous observation of the sodium chloride excretion, which would be impracticable. The favorable results obtained with a diet free from sodium chloride in the hydrops of pregnancy by Kramer and Jäger are dependent on a scientific basis. On the other hand the fact that the kidney of pregnancy is unable to excrete water as freely as a normal kidney, would make it appear that the milk diet, which is easily employed in such cases, is not a satisfactory procedure. Eckelt, in view of his results, advises a restriction in the amount of fluid administered. In the cases observed by him, he employed a diet with a restriction in the amount of water and sodium chloride. He found that the edema disappeared, the blood pressure became reduced, and the functional disturbances from having become active, became latent. He considers that this has a favorable action on the heart which is thus put in a favorable position during possible convulsive seizures.

Coagulation of the Blood in Pregnancy and the Puerperium.—Hofmann (*Ztschr. f. Geb. u. Gynäk.*, Bd. lxxv, Hft. 2) has studied this phenomenon in relation to thyroid disturbances during pregnancy and finds that in pregnant women with a normal thyroid gland the coagulation time of the blood is somewhat hastened. In the presence of hypothyroid conditions the coagulation time is hastened somewhat more than in normal pregnant women although this point requires further investigation. The coagulation time of the blood during labor is reduced in about 50 per cent. of the cases and no differences are to be found between normal hyperthyroid and hypothyroid subjects. During the puerperium coagulation is again gradually restored to normal and here likewise no difference

can be made out in the three classes of women just referred to. In women presenting hyperthyroidism there is found in about 40 per cent. of the cases a slight absolute and relative lymphocytosis which disappears soon after labor but returns again during the puerperium. Where hypothyroidism is present the relations correspond to the normal conditions. The freezing point of the blood of pregnant women is somewhat higher as compared with that of the blood of nonpregnant subjects. In women who present hyperthyroidism, a lowering of the freezing point is present during pregnancy.

The Biological Relations between Mother and Child.—Fellenberg and Doll (*Ztschr. f. Geb. u. Gynäk.*, Bd. lxxv, Hft. 2) present the results of an extended research in which an attempt was made to determine the degree of immunity in the new-born toward various bacteria, or in other words, what bacterial antibodies are present in a normal baby as compared with the maternal serum. They found that there was no well-marked agreement in the behavior of the maternal and the child's organism as regards the biological relations of the normal antibodies and agglutinins, bacteriolysins and hemagglutinins, in contrast to the various antigens. No experimental basis was found for the supposition that the normal antibodies of the fetus and the new-born child are transferred from the mother before labor or after, the latter through the medium of nursing. On the contrary the author believes that the normal antibodies in the fetus are autogenous in origin and that their formation is a natural function of the body cells. The demonstration of normal antibodies as carried out by the author leads to the conclusion that the fetus is possessed of a completely developed cell chemistry which includes receptors of all kinds, intended for nutrition, of which a number are also provided against pathologic bacteria. Accordingly the fetus even before birth must be looked upon as an independent individual with a normal antibody formation and a cell chemistry.

The Action of the Internal Secretions on the Activity of the Uterus.—Guggisberg (*Ztschr. f. Geb. u. Gynäk.*, Bd. lxxv, Hft. 2) has studied by means of the graphic method the stimulating or inhibitory effects of various substances on the motor activity of the uterus. The uteri of guinea pigs, taken both from pregnant and nonpregnant animals, were employed. The organ was removed from animals recently killed, suspended in Ringer's solution and connected with the sphygmograph. As soon as a regular curve of the uterine contractions was produced, the substance to be tested was injected slowly into the solution in the neighborhood of the uterus. It was found that human placental extracts stimulated the motor function of the uterus but the efficacy of individual placentæ varied considerably, although the writer believes that this may have been due to differences in the organ subjected to the test. There did not seem to be any difference between the pregnant and nonpregnant uteri in these animals and the activity of the extract diminished very rapidly, no effect being obtained after forty-eight hours. Corpus luteum extracts obtained from cows manifested in most cases a weak inhibitory effect. Variation in the efficiency of a glandular

extract such as that from the corpus luteum is due to the well-marked periodical changes to which such structures are subjected. The most marked inhibition resulted in the early pregnancies, which fact is believed by the author to be dependent on the sedative effect which the corpus luteum exerts toward favorable implantation of the ovum. Thyroid extract obtained from freshly killed sheep manifested a well-marked stimulating effect on the guinea-pig uterus. Thymus extract, on the other hand, had no effect whatever. Extracts made from the uterus of a pregnant cow produced a well-marked tonic contraction followed by single contractions which succeeded each other rapidly. Although this experiment was not sufficient to draw definite conclusions, the author believes that the production of labor pains may be ascribed to the presence of hormones and that all mechanical influences are of secondary significance. The serum obtained from normal nonpregnant and pregnant women produced a slight increase in the tonic contractions of the uterus but it was not possible to determine whether the serum of pregnant women manifested any more marked effect than that from normal nonpregnant women.

The Influence of the Thyroid on Labor Pains.—Mosbacher (*Ztschr. f. Geb. u. Gynäk.*, Bd. lxxv, Hft. 2) has studied the effects of feeding various thyroid preparations in both animals and the human subject. Among forty-one women to whom thyroid extract was given by injection in doses of 2 c.c., or more, twelve manifested an increase in the number of uterine contractions and one an increase in the force. In twelve of these cases the thyroid extract was combined with adrenalin. In seven cases of this series the result was satisfactory both as regards the number and strength of the pains, but no apparent effect on the expulsive force could be determined. The author does not believe that the injection of any thyroid preparation is of practical value in stimulating labor pains.

The Diagnosis of Syphilis in Mother and Fetus.—Krukenberg (*Ztschr. f. Geb. u. Gynäk.*, Bd. lxxiv, Hft. 2-3) studied the Wassermann reaction in a series of 120 normal labors and 82 pathological cases, using for the purpose the retroplacental blood, blood from the umbilical vein and where a control seemed necessary, blood from the vein of the mother's arm. It was found that the serum obtained from the retroplacental blood was of no value in deciding the question whether syphilis was present in the mother by means of the Wassermann reaction, because this test is apt to be positive in about 34 per cent. of women who are apparently healthy. This percentage is subject to an even greater increase in pathological labors, in prolonged labors, strong pains, and eclampsia. In making the test with the retroplacental blood a confirmatory examination should always be conducted with the blood from the vein of the arm. The positive result of the Wassermann reaction in these cases probably depends on the presence of albumin lipoid combinations derived from the placenta. Blood obtained from the umbilical vein of children born of healthy mothers regularly gives a negative Wassermann's reaction and in pathological cases, a positive reaction ex-

clusively in hereditary syphilis. A negative result with umbilical blood does not mean that the fetus has been infected during labor or that a hereditary infection of the fetus without clinical symptoms is present, although the apparently healthy mother presents a positive reaction, or one or the other parent is afflicted with an undoubted case of syphilis. Notwithstanding these restrictions the blood obtained from the umbilical vein is well suited for testing the existence of hereditary syphilis of the new-born and is well adapted in general practice in suspicious cases.

The Treatment of Labor in Flat Pelves.—Kuny (*Ztschr. f. Geb. u. Gynäk.*, Bd. lxxiv, Hft. 2-3) has made an extended study of the material from v. Herff's clinic in Basel during a period of ten years. The number of labors during this time was 14,840, among which there were 2036 (17.7 per cent.) of flat pelves. The mortality of the mothers with contracted pelvis was 0.48 per cent. The number of cases of fever in the puerperium including 301 mothers (or 22 per cent.) of which eighty-six had fever that stood in no relation with the labor, so that the morbidity was reduced to 15.7 per cent. The total mortality among the children amounted to 8 per cent. The author believes that these results show that conservative treatment as practised in the clinic of Basel, combined with the induction of premature labor, and the high forceps, affords results which are as good as those obtained with more radical treatment including pubiotomy and Cesarean section. Kuny believes that those who value the maternal life more than that of the child should depend on the premature induction of labor, with which in the clinic referred to, 88.7 per cent. of spontaneous deliveries resulted. He believes that the best method for this purpose, in private practice, is rupture of the membranes.

The Treatment of Toxemia of Pregnancy with Serum and Ringer's Solution.—Richard Freund (*Ztschr. f. Geb. u. Gynäk.*, Bd. lxxiv, Hft. 1) presents the results of this method of treatment in cases of dermatitis, hyperemesis, and eclampsia complicating pregnancy, at the Charité in Berlin. Freund believes that it is advisable in all cases of dermatitis and hyperemesis to administer from one to three subcutaneous infusions of about 200 c.c., of sterile Ringer's solution or Locke's modification of the same. If this method fails, then an injection of 20 c.c. of horse or human serum may be administered subcutaneously or intravenously. The writer is inclined to doubt the value of such procedures in eclampsia, in view of the much more acute course of the disease in this intoxication. He suggests that a prophylaxis against these intoxications may depend on the appropriate administration of potassium and calcium salts. This is claimed to have certain advantages over serum administration because of the easier preparation, keeping qualities, and harmlessness of the agents employed.

The Vitality of Homologous and Heterologous Spermatozoa in the Female Genitals and the Abdominal Cavity.—Hoehne and Behne (*Zentralbl. f. Gynäk.*, January 3, 1914) present an extended study as the result of which a number of theories previously held

have been reversed. Thus *a priori* it would be believed that heterologous spermatozoa in the body of animals of a different genus were at once killed and that the failure to conceive from cohabitation of animals of different varieties rested on this basis. This assumption is stated to be false because the authors found that both spermatozoa obtained from bulls and the human subject remained mobile in the vagina and uterus of rabbits. Further experiments showed that the stronger acid vaginal secretion of pregnant women caused the motility of spermatozoa to disappear rapidly, so that within an hour no living organisms were found. Vaginal secretions of nonpregnant women had a much less marked effect. The destruction of spermatozoa in the vagina seems to go parallel with the degree of acidity of the vaginal secretions. Experiments made with rabbits showed that spermatozoa of other species introduced in the supravaginal genitals of rabbits and guinea-pigs were killed within a short time, although in isolated instances they were found to remain alive for a period of four days. Spermatozoa of rabbits behave in the same manner as those from other species. Regarding the behavior of spermatozoa in the tubes, the authors claim that they remained alive for only comparatively short periods, probably not over three days. Human spermatozoa injected into the peritoneal cavity of rabbits were found to be killed very soon. In some cases they were found in the leukocytes in from twelve to twenty hours although isolated examples were found alive as much as thirty-two hours after introduction. From an experiment made in a newborn fetus which was expected to die soon after birth, injections of human spermatozoa introduced into the peritoneal cavity underwent the same fate as in animals, which leads to the conclusion that the same result probably occurs in the adult. It is likely that the life of the spermatozoa in the genital tract depends on the reaction of the tissues in the immediate vicinity. If the individual is healthy as regards her generative organs, the mucous membrane will react more readily and the spermatozoa will be killed earlier. On the other hand, if the genital mucous membrane is diminished in its vitality by inflammatory processes, the life of the spermatozoa will be prolonged. The well-marked antagonistic attitude of the peritoneum in the presence of spermatozoa, as determined by these writers, makes it very probable that conception distal to the abdominal opening of the tube rarely occurs, and that fertilization of the ovary or at the infundibulum of the tube is most unusual. This would require a coincidence in time between cohabitation and ovulation.

Formation and Absorption of Toxin in Intestinal Obstruction.—Davis (*Bull. Johns Hopkins Hospital*, February, 1914) has made a series of experiments in cats and dogs which show that the duodenal and upper jejunal mucosa, unaided by bacterial action, and in conditions not far removed from normal, can produce a highly toxic substance. Although phenolsulphonaphthalene is readily absorbed by the normal mucosa of the small intestine, this toxic substance is not. In closed loops one deals with a mucosa which displays nothing more than a slight hyperemia. Injuries from handling are negligible, and ab-

sence of normal secretions from above is readily excluded as a cause of the mischief. Loop contents themselves in concentrated form will not stimulate absorption of toxin from the lumen in a freshly made loop. It appears therefore that some condition existing in closed loops causes slight but important functional changes in the mucosa. It has been impossible up to the present to demonstrate any increased permeability of the mucosa to the toxic substance.

Radiation Treatment in Gynecology.—Henkel (*München. med. Wchnschr.*, 1914, No. 3) believes that the present status of this form of treatment may be summarized as follows. Conditions unsuitable for the Röntgen rays include sudden and severe hemorrhages which threaten life, in the presence of evidences of compression due to the position and size of the tumor, submucous myomata with severe hemorrhage, malignant or other degenerative processes, myoma in young adults in whom operative interference may result in a continuance of menstruation, and finally all cases in which the diagnosis is not absolutely clear and definite. Röntgen rays should be used with great care, as even during a course of careful radiation with strict attention to the dosage, filtration, etc., complications ensue, including intestinal disturbances, increased hemorrhage, fever, and lack of improvement in the general condition of the patient. Henkel claims that the principal indication in the application of the Röntgen rays is in the treatment of climacteric or other benign hemorrhages of older women, although even here it is advisable to do an exploratory curettage followed by a microscopical examination of the curettings. Within these limits this method of treatment is excellent and represents a great advance in gynecological therapeutics. In Henkel's clinic the results in the treatment of myomata improved as soon as the restrictions noted were adhered to. Thus in twelve successive cases a uniformly good result was obtained.

Meningitis Following Lumbar Anesthesia.—Senge (*Ztschr. f. Geb. u. Gynäk.*, Bd. lxxiv, Hft. 2-3) reports a case in which lumbar anesthesia was employed in a woman fifty-eight years of age in whom an anterior and posterior colporrhaphy was done. The day of the operation the patient developed a severe meningitis which rapidly became fatal. The diagnosis was confirmed by autopsy and a culture showed the presence of spore-forming non-motile bacilli possessed of great resisting power which were not killed by immersion in boiling water for a period of over fifteen hours and were only killed by the action of dry heat at 145 °C. after twenty minutes. This accident shows the necessity of subjecting all instruments and fluids employed in lumbar anesthesia to prolonged sterilization. The most suitable measure appears to be steam under pressure, as by this means the actual time can be shortened.

The Prevention of Peritoneal Adhesions.—Payr (*München. med. Wchnschr.*, 1913, No. 47) proposes to avoid the production of intra-abdominal adhesions by physical means. For this purpose he suggests filling the gastrointestinal tract with finely divided iron or a harmless iron combination, and then subjecting the distended organs to the action of a powerful magnet applied to the abdominal wall.

Reduced iron is employed because of its strong magnetic properties. After a number of animal experiments in which it was conclusively shown that the intestinal coils filled with the ferrated contents were drawn toward the magnet, the observations were extended to two women in whom adhesions around the sigmoid were present, but unfortunately painful sensations were experienced. The writer believes that these observations will be of diagnostic value in locating adhesions by the sensations of pain to which the procedure gives rise. Moreover, a further study of the subject with the use of magnets that have a more penetrating action may result in overcoming the adhesions themselves. He also suggests that displacements of the gastrointestinal tract may be overcome by this means.

The Treatment of Vomiting in Pregnancy.—Robert Asch has written a very interesting article in the *Berliner Klinische Wochenschrift* (1913, No. 28) in which he shows that the various grades of vomiting are largely dependent on a nervous or psychic basis. It is well known that other causes may result in vomiting, among which may be mentioned fright, pain, sorrow, and similar disturbances. In most cases where a toxemia is present, he believes that this is merely secondary and is the result of the loss of nutrition. He traces an interesting relation between the physical sensations of hunger and the vomiting attacks and claims that if a feeling of satisfaction is constantly present, in many instances the actual vomiting may be avoided. For this reason the morning nausea and vomiting may be overcome if the patient is given some food during the night. Another practical suggestion is that the meals be given at intervals of about two and one-half hours, alternating the diet between absolute fluids and absolute solids and not permitting any mixture at meal times. If the patient is restless at night, small quantities of food may be also given, including chocolate, cake, etc. The usual amount of water must be taken throughout the day and it is always well for the patient to lie down after a meal. In severe cases the author has had excellent results with various articles of soft diet which were frozen hard before administration. There are a number of other factors in connection with the treatment of these cases that must be carefully attended to. Needless to say, all sources of irritation, including gastrointestinal ulcers, enteritis, malpositions of the genital organs, myomata, hydramnios, etc., must all be taken into consideration and handled accordingly. Asch believes that a spasm of the cervical musculature is very often a source of irritation and that many cases of vomiting may be done away with if the cervix is subjected to careful gradual dilatation with tents, instruments, or a gauze pack which may be accompanied by a separation of the membranes around the internal os. He explains this factor in the production of vomiting by referring to the common occurrence of the latter in the colic attending the passage of a biliary or renal calculus. For this reason even where it has been decided to empty the uterus, sufficient time should be given after cervical dilatation has been resorted to for a possible subsidence of the symptoms. There is another region of the body which should

always be carefully examined in the presence of hyperemesis, and that is the nose and nasopharyngeal spaces. The presence of turbinated swellings, chronic catarrh of the pharynx, should always lead to steps for their alleviation. Even without the presence of a pregnancy, disturbances in this region are apt to lead to attacks of vomiting.

Immunization of the Blood Against Sepsis.—Krohl (*Berliner klin. Wchnschr.*, 1913, No. 42) has observed that women who have been mercurialized were able to go through the puerperium after their abortion, which was free from symptoms, although they were under the most unfavorable hygienic surroundings; moreover, that in syphilis, both during and after treatment with mercury, the patient presented a more marked resistance to infections of all kinds. He experimented with injections of benzoate of mercury in a large series of rabbits and found that if given in the proportion of 1.5 mg. to the kilogram of body weight, the animal was insensitive to infection by streptococci for an indefinite period. Injections of larger doses in the earlier stages of an infection restrained the development of a general septicemia and the process was localized in most cases. Small or delayed injections of mercury are of no avail in overcoming the infection and a fatal issue could not be avoided. The author employed the procedure in a series of cases of puerperal fever and found that the injection of solutions of benzoate of mercury into the gluteal region was invariably followed by improvement except those in which the injection was delayed. From 0.01 to 0.02 gm. of the drug was employed. Krohl believes that the mercury thus introduced into the organism is excreted by the kidneys and in doing so is distributed by the blood and sterilizes the same. It is thus made antiseptic and exerts its influence on every organ in which the infective bacteria may be present. The author believes that the greatest value of this measure is in the prophylaxis against septic infection, especially in cases of labor where interference is necessary in the presence of inflammatory processes in the genital organs.

The Etiology of Uterine Myomata.—H. Freund (*Ztschr. f. Geb. u. Gynäk.*, Bd. lxxiv, Hft. 1) calls attention to the now generally accepted contention that fetal cells are present in the uterus, which under certain conditions stimulate the muscular tissue to proliferation. The objection that these fetal foci have never been found has been disproved by the later researches of Recklinghausen and W. A. Freund. It has also been demonstrated that leiomyoma are developed in a similar fashion. Another factor of interest is the statement that the dorsal aspect of the body of the uterus seems particularly predisposed to tumor formation. It has also been found that both small and large subserous and intramural myomata contain epithelial inclusions, although these are separated from the remaining uterine tissue by a connective-tissue capsule. The writer has made further studies along these lines which confirm previous findings and lead him to the conclusion that not only adenomyoma, but the ordinary fibroids are derived from an epithelial basis. These epithelial elements may be entirely done

away with during the growth and the resulting pressure from the tumor. He has shown very conclusively in addition that deficiencies in the development of the uterus or malformations of the same predispose to the growth of myomata and other tumors. The so-called uterus duplex which is often found in connection with such growths is regarded by him as particularly predisposing toward their formation. In addition it is found that infantile conditions of the uterus, which are part of general constitutional anomalies, also seem to exert a marked influence.

Precancerous Conditions.—Hanseman (*Ztschr. f. Geb. u. Gynäk.*, Bd. lxxiv, Hft. 1) believes that in studying the etiology of cancer, we have not given enough attention to the earliest manifestations of the same in relation to their production, and that the surgeon usually only becomes acquainted with the final act of the drama. There are many sources of irritation which in susceptible individuals may lead to cancer formation. These factors in the etiology may be avoided, or, if recognized sufficiently early, might be done away with. It must be acknowledged, however, that in a large number of cases the source of irritation is practically unknown and this information can only be obtained by a careful history extending over a long period of years. This of course is only possible in those individuals who are under constant observation and control. Hanseman thinks that the family doctor is afforded such an opportunity and in a position to supply the desired information. It is acknowledged that the personal observations of the physician and the interpretation of the symptoms may lead to erroneous impressions. For this reason the statements of the laity, particularly where the subject is poorly educated or unobserving, are of lessened value. There is no doubt, however, that the collection of this knowledge will serve to forward efforts at the prophylaxis of carcinomatous disease. Among the sources of irritation that may constitute a precancerous stage, the author calls attention to chronic ulcerations. Malignant degeneration in such a locality will not result unless a transition in the character of the cells occurs, which Hanseman describes as anaplastic. He considers that an individual's predisposition is an important factor in this process. The stronger the disposition, the less the irritation and the time needed for its effect.

The Influence of Castration on the Growth of Bone.—Sellheim (*Ztschr. f. Geb. u. Gynäk.*, Bd. lxxiv, Hft. 1) has already shown in a previous experimental research that castration in youth resulted in an inhibition of bone production which usually occurred at the time of puberty. He claimed that this was due to the production of some chemical substance of the testicles or ovary given off at the time of puberty. The author has made further studies on the relation of bone growth and the secretions from the genital glands in those animals which present a recurrent growth of osseous tissue during adult life. These animals include those which are subject to a regular loss of horns, of the type presented by the deer. Sellheim found that in young bucks which were castrated, the bony basis for the horns, and the horns themselves, failed to appear.

If older animals are taken after the formation of the bony knob on the forehead has begun, it was found that a permanent production of bone resulted in place of that which recurred at regular intervals.

GYNECOLOGY AND ABDOMINAL SURGERY.

Adnexal Tuberculosis.—F. Ivens (Proc. Roy. Soc. Med., 1913, vii, Obst. and Gyn. Sect., 6) says that, excluding those cases of genital tuberculosis which are associated with another active focus, operative treatment is the most generally satisfactory. Although cases not infrequently undergo a spontaneous cure, the tuberculous products, even when encapsuled, may be a source of danger many years later. The removal of even a very chronic tuberculous focus is usually followed by marked improvement in the general health and appearance. Of twenty-two cases in which laparotomy was performed, one died on the sixth day, one in two months, and one in one year after operation. The other nineteen recovered and sixteen of these were traced subsequently and were doing well.

Treatment of Postoperative Abdominal Adhesions by Postural Method.—L. H. Reichelderfer (*Surg., Gyn. and Obst.*, 1913, xvii, 755) records a symptomatic cure, by this means, of extensive peritoneal adhesions which had previously reformed after separation with Cargile membrane. In spite of the fact that this patient, who had previously been in hospitals within four years on ten occasions aggregating 250 days and had undergone six operations, has now remained comfortable for nearly four years, the writer is convinced she has as many adhesions as she ever had. The present ones, however, were formed when the abdominal contents were in their lowest position, so that there is now no pull on the parietal peritoneum when the patient is erect. We must admit the impossibility of permanently removing these adhesions; but many of these desperate cases can be greatly benefited by postural treatment after the adhesions are broken up at operation. For this plan to be effective it is necessary, *first*, that all or nearly all adhesions be broken up, especially on the sensitive parietal peritoneum so that the abdominal contents may adjust themselves at as low a level as possible immediately after the operation; *second*, that the raw surfaces must be kept apart for twelve or eighteen hours by salt solution, until the patient can be placed in the upright position, which must be done as soon as possible as it is known that raw peritoneal surfaces adhere very quickly.

Intranasal Treatment of Dysmenorrhea.—In a series of ninety-three cases in which uterine disease as a causal factor had been excluded by gynecological consultants, E. Mayer (*Jour. A. M. A.*, 1914, lxii, 6) found that permanent relief of dysmenorrhea was obtained by intranasal treatment in from 50 to 75 per cent. of the cases. Trichloracetic acid applied to the so-called genital spots—the tuberculum septi and the anterior portion of the inferior turbi-

nates—four times at intervals between menstrual periods is usually sufficient to obtain lasting results.

Homöorganotherapy in the Treatment of Gynecopathies.—Sebastian Recasens Cirol (*Arch. mens. d'obst. et de gyn.*, Oct., 1913) suggests the use of an extract of the ovaries of women who have had the uterus and ovaries removed for myoma uteri in treating certain forms of dysmenorrhea, especially such as accompany infantilism of the uterus. This idea was suggested by the following facts. There are recognized alterations of the ovaries in women whose uteri are myomatous, consisting of a hyperplasia of the cellular elements of the stroma. There is also a process of hyperovulation going on, as is shown by the presence in the ovaries of several corpora lutea in various stages of evolution. The author believes that these alterations of the ovaries are the cause instead of the effect of the myoma. The elements of the myoma are fibrocellular, an increase of the supporting structure, with a moderate development of unstriped muscle, similar to the increase in the structure of the uterus in pregnancy, though less in degree. Histologically the corpora lutea of pregnancy are characterized by a hyperproduction of the cellular elements of the stroma, just as in myoma. This production of cellular elements is the cause of the internal secretion of the ovary. An arrest of the ovarian function is almost always accompanied by an arrest of growth or a regression of the myoma. The x-ray and radium lessen ovarian function and the growth of myomata. Castration also lessens the growth of myomata. This idea that the neoplasms of the uterus are dependent on hyperplasia and hyperactivity of the ovaries has induced the author to make use of the extract of such ovaries in the treatment of dysmenorrhea due to infantile uterus. At least one-third of the dysmenorrheas are due to this cause. There is a lack of development of the uterus, especially of the anterior wall, and also of the glandular structure of the mucosa, and a failure of ovarian development. Menstruation is poorly established and painful. Amenorrhea and hysteria follow. In some cases marriage causes uterine development and dysmenorrhea is relieved. The extract of myomatous ovary should excite these infantile uteri and relieve dysmenorrhea, and for this purpose has been used by the author in seven cases, with benefit.

Tumors of the Breast.—A. Gosset and P. Masson (*Rev. de gyn.*, Oct., 1913) give an anatomico-pathological study of the tumors of the breast which they have observed, including fifty-two cases of epithelioma, fifteen of adenofibroma, thirty-six of cysts, three of tuberculosis, one of sarcoma. From his studies the author believes that the occurrence of a cystic condition, which began as an inflammatory affection of the gland, is the precursor of the other mammary tumors and a predisposing cause of cancer. During a certain time after its beginning the existence of the cancer cells are impossible of demonstration without making a minute histological examination of the tumor. Clinical and macroscopic means do not suffice to show its existence. It is during this early stage that operation should be undertaken in order to be thoroughly successful in removing all

cancerous tissues. Repeated examination of all parts of the tumor must be made in order to be sure that no cancer cells are present. Simple inflammatory conditions leave behind them epithelial transformations and scleroses which do not disappear. The delicate acini and canals of secretion become obstructed and the epithelium multiplies; if the walls resist, a cyst is formed. This cystic condition is frequently followed by cancer formation.

Chronic Cystitis in Women not a Disease.—G. G. Smith (*Jour. A. M. A.*, 1913, lxi, 2038) holds that persistent cystitis in women is in itself not a disease, but is the result of pathologic conditions outside the bladder, and demands thorough study of individual cases. He supports this contention by summarizing a study of ninety-eight cases of chronic cystitis, eleven of which were so incompletely observed as to be excluded from consideration. Of the remaining eighty-seven cases he found renal infections, not tuberculous, in 61 per cent.; renal tuberculosis in 19 per cent.; difficulty in emptying bladder in 7 per cent.; systemic and pelvic infections in 7 per cent.; other causes in 6 per cent.

Treatment of Large Ventral Hernia by Inversion of the Sac—I. S. Haynes (*N. Y. State Jour. Med.*, 1913, xiii, 630) advocates this method for very large ruptures that seem almost beyond the ordinary methods of treatment. After separating the skin and fat from the sac, and either with or without opening the sac, the slack of the latter is inverted into the abdominal cavity with a continuous Lembert suture of No. 2 plain catgut doubled. Two rows of interrupted mattress sutures of heavy kangaroo tendon, breaking joints with each other, then unite the edges of the hernial orifice, each suture taking up about an inch of the external fascia. Retention sutures of bronze wire, silkworm, or chromic gut are used to take the strain off the mattress sutures. These sutures are placed in the figure-of-eight manner and brought out through the skin at a distance of from 2 to 4 inches from the skin incision where they are tied firmly over rolls of gauze or a large rubber tubing. A drain of rubber tissues should be inserted before the skin is closed with silkworm or plain gut. If the sac is not regularly opened, the danger of perforating the intestines in inserting the sutures may be avoided by making small incisions in the sac through which a finger is inserted and used as a guide.

Experiments on the Action of Tissue Extracts of the Placenta and Female Sexual Organs on the Genitals.—Fellner (*Archiv. f. Gynäk.*, vol. c, Hft. 3) has studied the effect in rabbits of a long-continued series of injections of extracts of placenta, membranes and of the female genital organs. It was found that the placenta, the membranes and the corpus luteum contain substances which when injected subcutaneously or intraperitoneally, exert an influence on the growth of the breasts, the uterus, the vagina and likewise bring about a parenchymatous nephritis and a stoppage in the growth of the hair. Marked secretion was not observed. These substances are taken up in a salted extract, insoluble in alcohol, ether and acetone

and are probably lipid in character. In guinea-pig uterus removed from the body, the watery, alcoholic or ether extracts of placenta produced long-continued contractions.

Malignant Degeneration of the Epithelium of Chorionic Villi.—Nagy (*Arch. f. Gynäk.*, Bd. c, Hft. 2) reports a case in which a curettage was done for hemorrhage after operation. The histological examination afforded a suspicion of chorioepithelioma and three weeks later a total extirpation was done. The endometrium failed to show evidences of tumor formation, but in the muscular layer close under the same, a nodule was found which did not have any direct communication with the uterine cavity. The author believes that this was the central development of a malignant process and a further search disclosed another foci near the serous coat which was derived from a placental villus. He states that this was the result of malignant degeneration of the epithelial covering of a villus which was free in a blood-vessel distant from its original site. Such a finding disagrees with Veit's theory of the development of chorioepithelioma in secondarily displaced epithelium. There were no further metastatic processes found and the author considers that this case proves that such malignant tumors may arise from villi which are simply retained in the uterine tissue as well as from those which have been primarily displaced.

The Diagnostic and Therapeutic Significance of Gonococcus Vaccines in Gynecology.—Hauser (*Arch. f. Gynäk.*, Bd. c, Hft. 2) presents an extended study of the development of this procedure which he has applied in a series of twenty-three cases in the Rostock Clinic, among which the results were as follows. In the adnexal tumors, in which an account of the presence of marked adhesive processes no restitution to the original condition was to be expected, well-marked improvement of the subjective symptoms, and of the general condition of the patient was noted. He ascribes this to a tonic influence of the vaccine which was marked by an increase in the body weight of the patient, and an improvement in the appetite and general ability. Objectively either no improvement or only a slight change could be determined in old adnexal tumors, but in the more recent lesions including hydrosalpinx of considerable size, the results were surprisingly good. In five out of seventeen cases subjective and objective cures resulted and in six cases the subjective improvement was marked although objectively very little change could be detected. In several of these cases the improvement was subsequently confirmed by operation. In chronic gonorrhea of the cervix as well as in gonorrheal cystitis, the results were fairly good, likewise in a case of gonorrheal arthritis. Although this number of cases is limited it seems to show that the method is worthy of trial in those cases where the gonorrheal disease is circumscribed. Chronic connective-tissue changes, adhesions, etc., are not influenced by the vaccine. The use of the vaccine is contraindicated at the time of menstruation, or in the presence of a negative phase manifested by evidences of autoinoculation. During an acute or subacute peritonitis, vaccination should not be done. The method is by no

means free from danger and should only be carried out under strict knowledge and control. The diagnostic trials with the vaccines showed the following: A positive focal reaction accompanied by constitutional symptoms points to a gonorrheal infection. A negative result is not a proof, however, that gonorrhea is absent because the reaction may be prevented or interfered with by old foci, by mixed infection, or by too small a dose of the vaccine. For this reason, the method although of value as a differential diagnostic measure, is not to be accepted as an absolute indication of gonorrhea.

Anatomical Changes in the Pelvic and Thoracic Organs in Animals after Intraperitoneal Injections of Camphorated Oil.—Kawasoye (*Arch. f. Gynäk.*, Bd. ci, Hft. 1) studied this question in rabbits, guinea-pigs and mice with special reference to the effect on the peritoneum. It was almost universally found that in rabbits a reactionary peritonitis occurred as already described by Höhne and regarded by him as a foreign body peritonitis. Three stages in this process may be distinguished. First, the stage of endothelial proliferation and leukocyte infiltration; second, fibrin formation, and third, organization and slow absorption of the oil. Five cubic centimeters, of a 1 per cent. solution of camphorated oil to the 100 gm., of body weight does not manifest any distinct effect in rabbits. Fat embolism in the lungs is not excluded however with such an injection. The behavior of the peritoneum in the presence of the camphorated oil varies with the individual and the species. Guinea-pigs and white mice showed a much slighter and more irregular reaction than other varieties experimented with.

Amenorrhea and Phthisis.—Friedrich (*Arch. f. Gynäk.*, Bd. ci, Hft. 2) studied this question from a new standpoint, namely, does a tubercular process become worse in a lipoidemia and is it possible to trace any relationship between the ovarian function and tuberculosis? It has been found that amenorrhea is very frequent in the presence of a phthisis. In the attempt to trace a relation between the two, the determination of the lipoid content of the blood seems a feasible method. Probably the ovaries are extremely sensitive in this respect and the cessation of their function may be accompanied by a slight resistance of the body or a disturbance of the metabolism. It was found however by means of experiments in rabbits, that no increase in the distribution of the tubercular process follows a lipoidemia but that the contrary occurs. It is only in pregnancy that tuberculosis progresses, which shows that at this time other factors are involved. In the presence of toxemias, no effect on this process could be determined but an important rôle is played by a lipoidemia during pregnancy. It is possible that the determination of the lipoid content of the blood may serve as a satisfactory diagnostic aid.

The Influence on the Genitals of Extirpation of the Suprarenal Capsules.—Novak (*Arch. f. Gynäk.*, Bd. ci, Hft. 1) presents the results of his animal experiments which show that this procedure in rats results in a hypoplasia, and eventually, atrophy of the genitals, the extent of which is in direct proportion to the age of the animal

at the time of the operation. Partial extirpation of the glands is not followed by any effect on the generative organs. The genital atrophy is especially well marked in animals in which tumors of these glands have been artificially produced. Novak believes that the process is not the result of reduction in the nutrition but depends primarily on the absence of a specific internal secretion of the suprarenal glands. The potency and ability to conceive is markedly reduced in those animals in which the suprarenals have been removed, but in animals already pregnant it does not have any effect on the latter. What little clinical information has been obtained in the human subject seems to be in agreement with the experimental results obtained in animals.

The Value of the Diagnostic Curettage in Carcinoma of the Uterus.—Burckhard (*Zeitschr. f. Geb. u. Gyn.*, Bd. lxxv, Hft. 1) claims that an exploratory curettage is not an absolutely certain diagnostic aid in the presence of the early stages of carcinoma of the body of the uterus. He even goes so far as to recommend that in all cases in which the clinical symptoms of a corpus carcinoma are present, that the uterus be removed notwithstanding the negative findings of a microscopical examination. In support of this view, he presents a review of four cases observed in recent years in which a careful microscopic examination failed to disclose carcinomatous changes in the uterine scrapings. Nevertheless in all of them a vaginal hysterectomy was done and a section of the uterus showed that either in the region of the cornua, or high up in the fundus, a small nodule was present which on histological examination showed evidences of carcinomatous changes, including proliferation of the epithelium, morphological changes of the individual cells, and invasion of the membrana propria. Both of these localities the curet would fail to reach. In all cases where a curettage is employed for diagnostic purposes, the patient should be kept under observation even where the findings are negative. In case any bleeding returns, the patient should again be curetted, as any nodule previously present may by this time have extended in size and so come within reach of the instrument.

Hysterography.—M. Fabre (*Arch. Mens. d'obst. et. de gyn.*, Nov., 1913) describes a method of getting a graphic representation of the uterine contractions in the puerperium and during labor. His apparatus records the contractions by means of a button pressing on the abdominal wall, and does away with any interference inside the uterus with its danger of infection. The contractions are recorded on two cylinders one revolving slowly and the other more rapidly. The slow cylinder shows the general course of the contractions for several hours: the rapid one runs for thirty consecutive minutes only, and must be replaced at the end of this time. The author has tested this apparatus in connection with one used internally registering from a balloon in the cervix, and has found his apparatus accurate. He has tested thus two cases, one registering 260 the other 300 contractions. The external trace gives accurate register of the duration and intensity of the contractions. This

method has no danger to the patient, and is well borne; it may be used in pregnancy, labor, and the puerperal state. It is easy to detect by it the useful contraction which is equal, separated by constant intervals, and strong. Unequal, abortive contractions are ineffectual. Contractions after labor occur regularly about fifteen minutes apart, especially in multiparæ. They have been traced five days after labor. The slightest infection stops these contractions. During nursing the contractions increase and are regular. At the end of the suckling they are stronger and longer. The author has studied contractions as influenced by sugar, pituitrin, and ergot. Immediately after a dose of sugar contractions increase, but are soon over. He has observed the inefficiency of pituitrin in pregnancy, and the immediate increase in labor after a subcutaneous injection, after a short interval of tetanus, regular stronger contractions appear, lasting about an hour. Ergot is more certain, and more prolonged than pituitrin, but must be used prudently. Morphine and scopolamin lessen contractions. Anesthetics stop them altogether.

Treatment of Vesico-utero-vaginal Fistula.—The patient whose case is reported by E. J. Maclean (*Jour. Obst. and Gyn. Brit. Emp.*, 1913, xxiv, 274) had undergone one unsuccessful operation for vesico-vaginal fistula. In view of deficiency of the anterior lip of the cervix and of the presence of considerable cicatricial tissue in the margins and neighborhood of the fistula, the tissue of the posterior lip was utilized and the fistula closed by turning the cervix into the bladder. Menstruation has occurred regularly at monthly intervals during the four years since this operation. For a few days prior to and during the period pelvic discomfort, frequency of micturition and even incontinence are present, but not in anything like a disabling degree. During the period the urine is red or smoky in color, and shreddy clots are passed, sometimes with dysuria or strangury. In the intervals between the periods the urine is neutral and gives no albumin reaction, while the microscope shows some pus and blood cells, renal epithelium and urate crystals. No casts are to be seen. Vineburg has reported a similar operation which was followed by repeated recurrence of calcareous deposits in the base of the bladder.

Cauterization of Inoperable Carcinoma of the Cervix.—H. A. Kelly and J. C. Neel (*Bull. Johns Hopk. Hosp.*, 1913, xxiv, 372) say that the extensive radical operation offers the greatest hope of absolute cure of carcinoma of the cervix. In advanced cases a preliminary curettage and cauterization is advisable for the following reasons: (a) A large portion of the friable new-growth may be removed through the vagina. (b) It is an important procedure in the disinfection of the vaginal field. (c) The induration in the broad ligaments, due to secondary inflammatory reaction, may be relieved, causing the new-growth to become circumscribed and rendering a previously immobile cervix mobile.

Dysmenorrhea and Opothrapy.—Paul Dalche (*Rev. mens. de gyn., d'obst. et de p  d.*, Nov., 1913) discusses a form of dysmenorrhea

often seen in healthy women, in whom no lesion of the uterus or adnexa can be detected, but which begins generally at puberty when the flow is established, and continues through the genital life. In these patients the flow is generally scanty, and the pain begins some time before its establishment even as much as ten days previous. The author believes this to be due to a toughness of the ovarian substance and the difficulty with which the ovule pushes its way to the surface of the ovary. The pain is often intense and the nervous symptoms marked. There are general malaise, flashes of heat, epigastric tenderness, agitation, and insomnia. There is also generally leukorrhea. The author believes that there has been an arrest of development of the ovaries and the ovisacs are strangulated by the albuginea. Tuberculosis, arthritism and gout are all found in such patients. Hypoovaria often coincides with hypothyroidia. The author has obtained excellent results in such cases by the administration of powdered dried thyroids, and ovaries. He gives a small dose in the beginning, and increases later, watching the heart carefully. The glands are given for ten days out of each month, generally beginning before the menstrual period. When ovary and thyroid are combined the author gives one in the morning, the other at night. Sedatives are also given for the pains. The pain is soon relieved, but treatment must be continued for months if a permanent cure is to be obtained. If the heart goes above 100 per minute the glands must be stopped.

Bilaterality of Malignant Tumors of the Ovaries.—A. Bertino (*Ann. di ostet. gin.*, Dec. 31, 1913) has made careful study of the cases of neoplasm of the ovary seen by him in the Women's Clinics at Florence, etc., with reference to the bilaterality of malignant tumors of the ovary. There were 468 cases of neoplasm of the ovary seen during this period. Only those cases were taken up in which the ovaries were removed, giving opportunity for examination of the growth. Of bilateral tumors found twenty-three were benign, forty-one malignant. Therefore it may be seen that bilateral tumors are predominately malignant. The benign tumors were: unilateral 266 in number, bilateral twenty-three; malignant tumors were: unilateral thirty-eight, bilateral forty-one. The latter included papilliferous cysts, carcinoma, sarcoma, hypernephrosis, and teratomata. Clinically we should always think of a malignant tumor when we find the ovaries affected on both sides, or of a tumor that may degenerate into malignancy. From this we draw the indication for prompt intervention in case of bilateral ovarian tumors; also for a radical operation in order to prevent metastases. Another question investigated was the relations of such tumors to involvement of the other genital organs. Of seventeen actively malignant tumors seven were not accompanied by lesions of the uterus; two uteri showed hyperplastic glandular endometritis; four adenoma uteri; one adenocarcinoma. In two there were subserous metastases and in one adenoma and subserous involvement. Alterations of the uterine mucosa in malignant and benign tumors are probably the expression of an irritation produced by the same stimulus in the various organs,

uterus, tubes, and ovaries. The author could not demonstrate any case of transference of neoplastic cells to the tube of the opposite side through the uterus. Nor could he substantiate transference of germs from one to the other ovary by way of the lymphatics, blood-vessels, or nerves. Some of these tumors are metastases from other abdominal organs. The most tenable theory for the condition is the existence and action of a single stimulus to the different genital organs. This stimulus is probably in the nature of abnormal elaboration of hormones by organs correlated with them.

Impregnation with Formol in Gynecology.—C. Le Masson and J. Marchal (*Ann. de gyn. et d'obst.*, Dec., 1914) find that the impregnation of the vagina with formol has a marked effect on vaginal discharges of all kinds, from simple leukorrhea to mucopurulent discharges. The latter are soon transformed into simple mucous discharges, and finally disappear. The drying action of formol causes retraction of cicatricial tissue. Ptosis is improved, and tonicity of the tissues increased. This action should be as continuous as possible, and treatment may be begun by the physician in his office, and continued by the use of other apparatus by the patient at home. The duration of treatment is from six weeks to two months. There should be no danger of sterility as a result of its use. The application of the vapor is easy, painless, and efficient. The author describes the instruments by which the vapor is generated and applied in the office and at home, and gives histories of ten cases treated by him. He makes use of commercial solutions of formaldehyde and crystallized permanganate of potash by which the vapor is freshly generated and applied hot as the gas escapes. It does not burn the tissues, but is comfortably warm.

Lavage of the Peritoneum with Ether in Acute Peritonitis.—Phelip and Tartois (*Ann. de gyn. et d'obst.*, Dec., 1914) believes that lavage of the peritoneum with ether in acute peritonitis is a distinct advance in the treatment of the disease. Since Feb., 1913, the method has been followed by the author in all cases of peritonitis and has given success in some of the most desperate cases. In all sixteen cases have been treated; one of acute appendicitis with residual abscess; three of localized peritonitis with acute appendicitis; seven of perforated appendix and generalized peritonitis; five of general peritonitis and appendicitis without perforation. The ether is to be used as an adjuvant to the peritoneal antisepsis. Drainage is first made and then the peritoneal toilet carried out. The liquid is poured directly into the peritoneal cavity, simply separating the wound, or pouring it through a drainage tube when we wish to penetrate to the depths of the abdomen and the culdesac of Douglas. The intestine at once becomes reddened. After the operation the patient is much more quiet than is usual; especially is this the case in children, who are so restless. Vomiting is less frequent and abundant, and there is some torpor. The ether has been used with salt, sugar, and adrenalin in solution. Histories of the sixteen cases are here given. There were nine recoveries, and seven deaths; of these, two died of respiratory complications; one of intestinal hemorrhages;

one after intestinal hernia; two after postoperative intestinal occlusion. Of sixteen other cases operated on without ether there were ten deaths and six recoveries. The deaths here were due to peritoneal intoxication, and three had occlusion of the intestine. The author concludes that ether has a favorable influence on the general condition, and death results only from late accidents which have been delayed by its use.

Treatment of Sterility in Women.—E. Reynolds (*N. Y. State Jour. Med.*, 1914, xiv, 4) says that sterilities may be divided in three classes: (1) Those due to the persistence of undeveloped or infantile organs. (2) Those due to altered conditions in the secretions of the genital tract. (3) Those due to failures of ovulation. Sterilities due to grave failures of development, except for the renewed development which sometimes follows an early marriage, are hopeless. Sterility is sometimes the result of a mere fermentation of one of the secretions and its consequent alteration into a condition hostile to the spermatozoon without any change in the mucous membrane which secretes it. It is frequently produced by localized alterations in the mucous membranes of such slight extent as to be incapable of producing symptoms. Mechanical conditions such as constrictions of the genital canal may lead to a retention of the secretions, with consequent inspissation to a degree of thickness through which the spermatozoon cannot make effective progress, or increase the rapidity of the outward flow of the secretion to a degree of speed which prevents the passage of the spermatozoon past the constricted point. At least two conditions of the ovary appear to inhibit ovulation, and are commonly remediable: *a.* Persistent corpus luteum. *b.* Distention of the ovary by retention cysts, usually with thickening of its capsule. In seven of the author's cases an enlarged and apparently persistent corpus was removed from the ovary and its bed closed over and in every one of the seven cases the operation was followed by the prompt appearance of pregnancy in a previously sterile woman. The addition of conservative operative treatment of retention-cyst ovaries to other methods of treatment of sterility in appropriate cases has added largely to the list of successes. Many of the minor cervical alterations can be reached by minor treatment or extremely minor operations. Mild infection is not infrequent and if so the appropriate cervical plastic work, with curettage and thorough disinfection of the cervical cavity alone will usually cure the sterility. In perhaps a majority of these cervical cases, however, alteration of the secretions has extended above the cervix at the time when they are seen, and in these cases curettage of the uterine cavity must be added to the treatment. In the majority of the minor affections of the tubes it is better to trust to the effects of good operative drainage from below under the care of nature rather than to use local applications to the tubes. When in a sterility case an examination under anesthesia demonstrates enlargement of both ovaries of even small degree or palpability of even one tube it is probable that an abdominal incision will be necessary before fertility is secured. In a few such cases and especially in those associated

with extreme antelexion and under-development of the cervix the obtaining of proper uterine drainage by a suitable discission of the posterior lip and division of the anterior attachments of the cervix will result in gradual subsidence of the abnormal ovarian or tubal condition as the result of improved drainage, but in the majority of cases by the time the adnexal abnormalities become palpable they will have become permanently established unless directly attacked.

Postoperative Results of Trachelorrhaphy Compared with Those of Amputation of the Cervix.—From an analysis of the postoperative results of the cases in the gynecological clinic of the Johns Hopkins Hospital, Y. N. Leonard (*Surg., Gyn. and Obst.*, 1914, xviii, 35) concludes that the presence of a marked endocervicitis should be considered as a contra-indication to the performance of trachelorrhaphy. Although serious postoperative hemorrhage is not infrequent after amputation of the cervix (5 per cent.), this accident is very uncommon after trachelorrhaphy. The influence of trachelorrhaphy in improving the general condition of the patient is, in properly selected cases, quite as marked as that of amputation of the cervix. In each instance about 90 per cent. of the patients report improvement in the general health. Although trachelorrhaphy may render a mild endocervicitis more amenable to treatment, it cannot be considered, like amputation of the cervix, as a curative measure for this condition. Laceration of the cervix is a frequent cause of dysmenorrhea in multiparæ, and its removal by either amputation of the cervix or trachelorrhaphy is followed by the disappearance or amelioration of menstrual pain in over 60 per cent. of cases. Fertility is much more likely to follow trachelorrhaphy than amputation of the cervix. After amputation of the cervix, the incidence of abortion and premature delivery is greatly increased, while trachelorrhaphy has no effect upon the course of the subsequent pregnancy. Labor after amputation of the cervix is usually difficult, while after trachelorrhaphy it is almost always normal. Amputation of the cervix is an operation to be avoided in women in the child-bearing period until all other therapeutic means have been exhausted. Trachelorrhaphy has a therapeutic efficiency, in properly selected cases, quite as high as amputation of the cervix, and, having no influence upon the subsequent marital history of the patient, is the operation of choice for women in the child-bearing period.

DEPARTMENT OF PEDIATRICS.

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GODFREY R. PISEK. M.D., *in the Chair.*

HEREDITARY LUES.

DR. SARA WELT KAKELS presented this patient, an infant six and one-half weeks of age. The parents were apparently perfectly healthy and had been married three years. The first pregnancy resulted in still-birth, the second in a child that, according to the statement of the mother, died of asphyxia at the time of birth, and the third in the infant presented, which was born at full term and was not asphyxiated. The child seemed to be perfectly normal until it was two weeks old when an eruption appeared and spread over the entire body. The palms of the hands and the soles of the feet were involved. There was a crusty bleeding eruption of the nose and mouth, and breathing was difficult. The organs of the thorax were normal. The liver and spleen were enlarged. The urine contained a considerable amount of albumin. The Noguchi modification of the Wassermann test was positive. Smears taken from the blebs of the planta pedis showed the presence of the spirocheta pallida; the examination of the blood of the apparently healthy mother showed a positive Wassermann.

The rule for the administration of salvarsan in these cases was about 4 mg. per pound of weight. Dr. Kakels said that it was her custom to treat such children with bichloride in small doses. This treatment had not been followed by any bad after-effects. The dose was 1 mg., and usually not more than six or eight doses were given.

DR. HENRY KOPLIK wished to say one word in regard to the treatment in these cases of hereditary lues. Many of these children when treated with salvarsan or neosalvarsan died. It was difficult in the new-born to gauge the exact dose and many infants did not bear salvarsan well. In his hospital work he did not use it. He obtained excellent results with calomel and iron. He did not favor the hypodermic use of mercury.

DR. L. E. LAFETRA said that, in cases in which the eruption was intense and the child in bad condition, salvarsan was of the greatest

service and would save some babies that otherwise would die; it could be given in one or two injections at an interval of a week or ten days; then mercurial treatment should be used, both by inunctions and internally. It often happened that a patient returned with a relapse of the Wassermann reaction after having been treated with salvarsan alone and then one had to return to the mercury, so that it was advisable to employ the mercury from the first.

DR. GODFREY R. PISEK said that in such serious conditions as syphilis complicated by a pneumonia, salvarsan, because of its quick action, would be indicated; but mercury was to be preferred in ordinary cases.

DR. KAKELS, in closing, said that in the administration of the bichloride she did not give it by way of the mouth, but used deep intramuscular injections in the gluteal muscles. One should watch for blood in the feces and for albumin in the urine.

HAIRPIN AND STONE IN BLADDER.

DR. KAKELS presented an x-ray plate showing the hairpin and stone in the bladder. The patient was a child nine years of age who had been complaining for two and one-half years. In 1913 she complained of severe pain in urination and of burning sensation. The urine showed the presence of much pus, but no renal elements. In making an examination per rectum she had felt a resistance, and the x-ray revealed the nature of the trouble. The child was taken to the New York Hospital where she was operated upon with excellent results. The hairpin and stone were removed and the child made a good recovery.

AN EXPERIMENT IN COLLECTING HUMAN MILK FOR HOSPITAL AND DISPENSARY USE.

DR. RAYMOND HOOBLER described his efforts in securing human milk in connection with the Children's Department of Bellevue Hospital and Dispensary. They had found that there were mothers who had a sufficiently abundant supply of milk to be able to part with a portion of it and still have sufficient to nurse their own infants. He had also found that it was possible to collect the milk and that such a plan worked well in two respects. It furnished breast milk to premature and delicate infants who would not otherwise survive and at the same time gave financial assistance to mothers who needed it. All those willing to sell their milk were subjected to a physical examination and to the Wassermann test. They were instructed in diet and hygiene and in the method of drawing the milk. Dr. Hoobler said that the cost of the milk obtained in this way was ten cents an ounce.

A SIMPLE METHOD OF MAKING CASEIN MILK.

DR. RAYMOND HOOBLER read a brief paper in which he described the method used at Bellevue Hospital of making casein milk with casein flour instead of the complicated method hitherto used of rubbing the curds through a sieve a number of times. By the use of

the flour a smoother mixture was made and the nipple did not clog. The curds did not settle as they did in the casein milk made by the old methods. Casein flour cost forty cents a pound and 1 pound made 44 quarts of milk, while it would take 22 quarts of fresh milk to make the same quantity of casein milk.

AN EXPERIMENT IN MILK STATIONS.

DR. S. V. HAAS recalled that in discussing Dr. Herman's paper before the Section in March, 1911, he had stated that it was his belief that there were two serious errors in the milk stations as constituted. First, the term "Milk Station" was bad because it led the laity to consider milk as the important feature, and cow's milk feeding as the method to be followed, thus subordinating, by inuendo breast feeding and hygiene. Second, the dispensing of milk was unnecessary either as a premium or as a method of furnishing good milk. For these reasons, as well as from the economic standpoint, it was undesirable for the mother who was required to go to the distant station for her milk supply, often at a stated time, when it could be equally well obtained near by. The practice of dispensing milk was not desirable for the station since it greatly increased the cost of maintenance by requiring a person to dispense the milk and ice to preserve it. It further deprived the authorities of a method of milk inspection not otherwise possible. If the milk used was purchased in the open market and a child became ill, the source of supply could be at once investigated to determine whether it was of the standard required by the Board of Health.

In order to test these points the following experiment was undertaken. Under the auspices of the Social Service Department and the Pediatric Departments of the Lebanon Hospital rooms were set aside in the dispensary building. The Social Service organization furnished a trained nurse as the active head worker, and volunteer assistants. The training school supplied nurses who received the social service experience as a part of their course. The Pediatric Department supplied the medical supervision.

The total number of babies that attended this milk station since April 1, 1912, was 455; of these 384, or 84.4 per cent. were breast-fed; 13, or 2.8 per cent. were on mixed feeding; 58, or 12.7 per cent. were artificially fed; 14 or 3.0 per cent. died, of which two died of malnutrition. The average attendance was nineteen infants, and the average length of time under observation was fourteen weeks.

Dr. Haas summarized as follows: 1. These stations should be called "Baby Stations" or some other name not containing the word "milk."

2. Milk should not be dispensed at these stations, because it tends to discourage breast-feeding, it places a burden upon the mother by forcing her to call for the milk, and it deprives the authorities of an obvious method of milk control and materially increased the cost of maintenance.

3. A "Baby Station" can be successfully conducted without dispensing milk.

4. Breast-feeding cases are increased by this method.
5. The mortality statistics compared favorably with those obtained under any other method.

TWO YEARS' OBSERVATION OF MILK STATION INFANTS.

DR. MARK S. REUBENS read this paper which was based upon the study of about 1500 feeding cases observed at the Vanderbilt Clinic Milk Station and the Vanderbilt Clinic Pediatric Department since January 1, 1909. Nearly 500 of the cases had been observed for one year. About 900 of the infants were artificially fed, about 300 were breast-fed, and about 300 received both breast milk and artificial feeding. At this milk station only nineteen infants died from January 1, 1912, to June 1, 1913, and five of these had been to the milk station only once. Of the remaining fourteen not one died of gastroenteritis.

The essayist stated that there were four factors which were conducive to a low mortality at the milk stations. These were education of the mother, clean milk, the nurse and the physician. Education of the mother was by far the most important element, though the others were indispensable adjuvants. For a physician to tell the mother how to prepare the food and to expect results, except in the case of extremely intelligent mothers, was a waste of breath and effort; all this must be done by the nurse at home. Anything that prevented the nurse from visiting the homes of these mothers frequently and regularly detracted from the efficiency of the milk station. Time should not be taken by the nurses in canvassing for new cases which should be spent on those already enrolled. The best advertisement to induce new mothers to bring their babies to the milk stations was the knowledge that the milk station babies were doing well.

It had been their experience that breast-feeding was not falling into disrepute as was so often stated. There were three reasons why so many of the infants at the milk stations were artificially fed. One was because of the high percentage of mothers who did outside work after marriage; another was that many of the mothers became gravid before their infants were three or four months old. Thus the exhausted condition of the mother due to excessive child-bearing resulted in atrophic and premature babies, many of whom were unwelcome visitors. Teaching these mothers how to prevent conception would have a great influence in reducing mortality and would permit of breast-feeding in many cases that were artificially fed. And finally, the indifference and ignorance of the attending physician was responsible for the artificial feeding of many infants that should and could have been breast-fed. In cases of insufficient breast milk every expedient to increase the supply should be resorted to before advising supplementary feeding; even though the milk was insufficient, there was not much danger to the infants provided they received plenty of water between nursings. During this time an attempt should be made to increase the milk supply through maltine, cornmeal, milk and other means. With the type

of women met with at the milk stations the beginning of supplementary feeding means that by the end of six or eight weeks the child will be fed artificially entirely. Even when supplementary feeding was employed every effort should be made to increase the supply of the mother's milk and as soon as this became sufficient the supplementary feeding should be discontinued. The practice of weighing the infant before and after nursing to determine whether the mother's milk was sufficient was an erroneous standard; the only reliable method of estimating the sufficiency of breast milk was by observing the infant for at least one week when it was on the breast alone, noting the weight at the first visit and at the second. It was paradoxical but true that the most difficult task the physician had was to persuade mothers not to institute artificial feeding when the milk supply was sufficient in early infancy, and to induce them to begin artificial feeding in later infancy when the breast milk was very scanty and the infants were practically starving. In many instances this was due to the false impression that the mothers could not become pregnant as long as they nursed. Very few women who frequented the milk stations could nurse their infants longer than twenty-seven to thirty-two weeks. They had made it a rule to wean the infants when their weight became stationary or they lost in weight for two successive weeks, all other causes having been excluded. These infants usually did well on the bottle and weighed more at the end of the year than those fed artificially from birth. They preferred weaning in two weeks to mixed feeding until the end of the year. Their experience had taught them that in later infancy when the milk supply became insufficient, it was also of inferior quality, and the infants put on mixed feeding did not do as well as those weaned and fed artificially.

Dr. Reuben presented a number of weight charts and pointed out that it was apparent from these that the infants who had been breast-fed until the milk supply became insufficient (usually at twenty-six to thirty weeks) were then weaned within two weeks, and entirely artificially fed showed the greatest weight at the end of one year among those infants whose weight at birth was about 7 pounds. Children who received supplementary feeding after they reached the age of six months did not do as well as those entirely artificial fed; this was probably due to overfeeding.

In early infancy insufficiency of breast milk was frequently only temporary, and those which did well on mixed feeding were those in which the milk supply increased under proper management, and then the artificial feeding should be stopped. The cases which did not do well were those in which the milk supply did not increase, and these cases did better if taken off the breast entirely. In some instances it took a month before the breast milk increased, one should, therefore, try supplementary feeding for at least a month before resorting to artificial feeding. If, however, at the end of this time the infant was not doing well and there was no increase in the milk supply of the mother, one should not hesitate to take such an infant from the breast entirely. This was not a plea for artificial

feeding, but one should not wait too long before resorting to artificial feeding. Good breast milk was better than good artificial feeding, but good artificial feeding was better than poor breast milk.

The second highest weight curve at the end of one year was shown by infants fed artificially from birth; it was midway between those fed on the breast entirely for one year and those fed on the breast for seven months and then fed artificially. Those breast-fed for the entire year presented the lowest curve, due to a mild starvation after the seventh month. The breast-fed children weighed more at six months than the artificially fed infants, but after that the artificially fed children gained much more rapidly.

In considering the subject of artificial feeding, Dr. Reubens said that the keynote of artificial feeding at the milk stations depended on the degree of simplicity of the milk formula and how well the mother understood its preparation. Over 90 per cent. of the infants did well on simple dilutions of whole milk to which carbohydrates were added to make up the necessary calories. In their experience less than 8 per cent. of the infants that did not do well on whole-milk mixtures did well on top-milk mixtures. As to the statement that a certain infant had an idiosyncrasy to milk, in 1200 cases they had met with only one such case. In the majority of cases of supposed milk idiosyncrasy the trouble was with the milk formula and not with the baby.

Of 200 feeding cases that came to their attention at the milk station, only 19 per cent. had been put on milk formulæ and 80 per cent. had been on patented foods. There was only one explanation of this and that was ignorance of how properly to modify fresh milk. Anything that complicated infant feeding would cause many physicians to resort to patented foods. Their experience had taught them that infant feeding could be made both simple and successful in the great majority of cases. In all their bottle babies they used simple dilutions of whole milk, and modified the milk only when there were indications to do so. They never used lime water, or barley or oatmeal water, or top-milk mixtures unless there was an indication to use them. They were thoroughly convinced that they were useless in most cases and could be dispensed with. The great majority of healthy infants could digest cow's milk, properly diluted, without any difficulty. Of course the digestion of cow's milk required a greater expenditure of energy than that of mother's milk, but the healthy infant easily accommodated itself to the extra demand made upon it, and likewise the stomach of the healthy infant soon became accustomed to the additional work placed upon it.

In feeding healthy infants they usually began with a one in three mixture, seldom was it necessary to prescribe one more dilute. The quantity given at each feeding was increased by 1 ounce every four weeks. The strength of the mixture was increased as the weight and the symptoms indicated. On the whole they had found that infants could take much stronger mixtures than were usually given. They could ordinarily take whole milk at six and one-half to seven

months. No infant received more than 1 quart of milk in twenty-four hours during the first year. As soon as an infant stopped gaining on 1 quart of milk daily, flour was substituted for part of the sugar and later cereals in the form of gruels were added. Beef juice was usually prescribed for infants at the age of six months and if they were anemic earlier. At nine months broths and zweiback were given, and vegetables finely mashed when indicated. A dextrin maltose preparation of sugar was used in every case unless there was some contraindication, one level tablespoon full of the sugar to every 10 ounces of mixture. It was found that this sugar was not well borne in infants under two months of age and that it was contraindicated in cases in which there was a tendency to constipation. Dry maltose dextrin preparations were not laxative. It also contraindicated in cases where there was vomiting. It was distinctly indicated for babies that were much under weight. In early infancy they had used cane sugar mostly. It was often stated that in healthy infants it made no difference which form of sugar was used. This had not been their experience. Dextrin maltose caused the greatest gain in weight, cane sugar less, and lactose the least. Their effect on the gastrointestinal tract was also different. Lactose had the least and maltose the greatest tendency to produce vomiting. Lactose was also the most laxative and dextrin maltose the least so of the sugars. In infants who did not gain they increased the quantity of milk in the formula; if this did not produce the desired result, they increased the sugar (never higher than 7 per cent.) if this failed, they substituted starch for part of the sugar; in some cases they resorted to top milk mixtures with excellent results.

In the feeding of sick infants they had found that simple dilutions gave excellent results, though every sick infant was a problem in itself. In cases in which there were gastrointestinal symptoms they never gave dextrin maltose until the symptoms had subsided. In these cases they had used the flours more freely than in the healthy infants. The intervals between feedings were also made longer. In order to meet indications they had used skimmed milk and Eiweiss milk.

The essayist then presented a study in calories accompanied by numerous charts which he summarized by saying that the caloric estimation was of distinct value under the following circumstances: 1. In beginning to feed a healthy baby with the bottle, they had a definite way of ascertaining about how much food the infant needed. 2. In feeding atrophic and puny babies they knew that they required more calories than did healthy infants of normal birth weight. 3. In infants who were not thriving, and where there was no apparent cause for failure to gain, estimation of the calories at times revealed that they were getting a food that was too high or too low in calories.

In studying the problem of why some infants did not thrive, they had been much impressed with the fact that the most common cause of this was the irregular and infrequent visits to the milk station, for an artificially fed infant to increase steadily and gain weight the food must be increased in quantity and in quality regularly. It had been

their experience that artificially fed infants should have the food slightly increased about every ten to fourteen days to get the maximum gain in weight. Other reasons for failure to in properly were ignorance or stupidity of the mother in the preparation of the food, or some constitutional disease.

THE INFANT'S MILK STATIONS: THEIR RELATION TO THE PEDIATRIC CLINICS AND TO THE PRIVATE PHYSICIAN.

DR. S. JOSEPHINE BAKER said that the Bureau of Child Hygiene of the Department of Health was organized in 1908 for the purpose of pursuing a progressive and constructive policy with relation to the health of the children of the city. Its activities included practically all features of child welfare work in relation to health, but one of the most important of its functions was the attempt to reduce infant mortality.

In 1907 the death rate from all causes of children under one year of age was 144 to each 1000 births. During the previous four years there had been but slight fluctuation in the rate. It was felt that the former methods of dealing with this problem must be discarded and a campaign of educational prevention must be instituted, in order that there might be a definite imprint made on this excessive mortality. No particular funds were provided for this work. The result from the change from the purely corrective work of the past, which consisted in visiting families to see if sick babies could be found and then offering them treatment, to the present method of sending nurses to visit babies as soon as possible after they were born and of instructing the mother in the methods whereby the baby might be kept well, were so marked that the first year, 1908, the death rate was reduced to 128 per 1000 births. It was felt that a year-round campaign must be instituted if true preventive work was to be done. As the result of an appeal to the Board of Estimate the budget appropriation allowed for the establishment of fifteen infant's milk stations to be maintained under the control of the Bureau of Child Hygiene. The city of New York had ample facilities for caring for sick babies but until the establishment of the milk stations practically no facilities for providing proper instruction in "how to keep the babies well." It was obvious from the facts cited that the treatment of sick babies had little appreciable effect upon the reduction of infant mortality. An Association of Infant's Milk Stations was formed in 1911 embracing all the prominent agencies engaged in combating infant mortality. This organization was effected in order that the records might be uniform in all instances and that the city might be districted to avoid overlapping of the work, or encroachment upon another's territory. The year showed a death rate of 112 as compared with 125 in 1910, or an actual numerical decrease of 1162 deaths, which demonstrated the value of this systematic cooperative work. As a result of the proved efficiency of this kind of work and increased appropriation was granted the Board of Health sufficient to establish forty additional

milk stations, making fifty-five in all under the Bureau of Child Hygiene.

The infant's milk stations were not children's clinics, their purpose being rather to provide instruction in the proper hygiene and feeding of infants. One of their most important achievements was the encouragement of breast-feeding. Eighteen inspectors were assigned to duty in this work, each having charge of three stations and spending two mornings each week at each station. During the summer additional inspectors were assigned to duty so that each station had a doctor in attendance each morning. Each station was in immediate charge of a trained nurse, who had an assistant. In addition there was the employee who sold the milk. The milk now sold in these stations was "Grade A. pasteurized," for which the company charged eight cents a quart, a much lower rate than the regular market price. It was dispensed in one-quart bottles only and was subject to constant analysis and inspection by the department in order to see that their standard was maintained.

Mothers and babies were received at the stations by the nurse who, if the doctor was not present, took a brief history of the case; if instruction in feeding seemed essential, the nurse gave the directions according to a prearranged outline of simple milk dilutions suited to certain ages. The mother was instructed to return on the first day on which the doctor would be present. At that time the baby was thoroughly examined by the doctor and if artificial feeding was necessary, an individual formula was prescribed for each case. One copy of this was given to the mother and the other to the nurse. The nurse gave the mother instruction at her home in the preparation of the formula. The formulæ of milk dilutions used by the nurses were simply temporary expedients and were devised by a committee of which the president of the Section, Dr. William P. Northrup, was Chairman.

The physicians assigned to duty in these stations were competent, thoroughly trained men and women. Only those physicians were selected who had demonstrated their fitness in the specialized work of infant hygiene and feeding.

Sick babies were not treated at these stations unless the illness was caused by an error in diet and was amenable to dietetic treatment. Even in such cases the treatment was not given unless the family were unable to employ a private physician and refused to go to a dispensary or hospital. All other sick cases were referred immediately to a private physician of their own selection, or, if unable to pay for treatment, to the most accessible dispensary or hospital. With each baby was sent a reference slip, giving the name and address of the child and the formula which was being used in feeding. Requests had been made of all the dispensaries and hospitals to send a similar reference slip to the milk station after the baby had left the care of the institution. It was evident that such data was of immense importance, for when the baby was transferred from the milk station to the hospital or in reverse order, if the feeding formula was not known, much valuable time was lost in attempting to find out the

best type of feeding for the child. The department, therefore, strongly urged the pediatric clinics and babies' hospitals to use these reference slips. When babies were once registered at the milk station, they were kept under continuous observation. If death occurred either under the care of a private physician, a pediatric clinic or in a hospital the death was charged against the record of the milk station.

The milk stations welcomed the cooperation of the private physician and many of the latter had sent babies to the milk station for milk and for instruction of the mothers as to how the formula was to be prepared. Whenever a private physician sent a prescription for the feeding formula and stated that the baby was under his care, the doctor at the milk station did not see the baby.

In such instances the nurse instructed the mother in the methods by which this formula might be prepared. Any infraction of this rule was dealt with summarily. Likewise, under no circumstances, was any employee of the Department of Health allowed to take as a private patient any person with whom he came in contact in his official capacity. Every effort was made to ascertain whether the women attending the milk stations were able to pay a private physician.

The milk stations were prophylactic centers, their object being the reduction of infant mortality, and the encouragement of breast-feeding by instruction of the mother in all methods of baby care and, when necessary, the provision of proper food.

During the year 1913 a total of 49,904 babies were cared for at these stations, 9295 of this number having been carried over from the previous year. The milk dispensed amounted to 2,367,495 quarts, and the nurses and their assistants made 262,121 visits to homes. During this period there were 145 deaths among the milk-station babies, three-tenths of 1 per cent. of the number enrolled. Of these deaths ninety-seven were due to diarrheal diseases and forty-eight to other causes.

During the year 1912 the infant death rate was 105 per thousand births and during 1913, this had been further reduced to 102. The reduction of infant mortality in New York City during the past ten years had been greater than that achieved by any other large city in the country. With the exception of Rochester, the infant death rate in New York City was lower than that of any first or second class city in the State. During 1913 there were 500 fewer deaths than during 1912.

That the Infant's Milk Stations had been the largest single factor in this result there could be no doubt. They had justified their existence as an important part of the propaganda for educational prevention of disease in infancy.

In closing Dr. Baker said that the Department of Health through the Bureau of Child Hygiene, believed that only through perfect cooperation and through understanding of its methods could the best results ultimately be achieved. It was the earnest desire of the Department of Health to cooperate to the fullest extent with the

private physicians, pediatric clinics and babies' hospitals. It was also its earnest desire that there should be similar cooperation on the part of the latter.

DISCUSSION.

DR. HENRY KOPLIK believed in the work of the milk stations and the *gouttes de lait* consultations, and at the same time he recognized the value of the prophylactic work done by the Board of Health. They did ideal work among the well babies. He said that he would not stop to discuss this but that he hoped that it would be allowed to develop.

It would not do to place too much reliance on statistics; many births escaped registration and this altered the value of mortality statistics. They would do well to consider the good work rather than the statistics.

Some of Dr. Reuben's statements he could not accept. He cited one infant of eight months as weighing 30 pounds and another of one year weighing 27 pounds; these were abnormal children and had no place in the paper. Dr. Reuben said that if a baby did not thrive on the breast it should be taken off entirely and fed artificially. The breast should be utilized as far as possible; if the baby took the breast six times a day and did not thrive, one should substitute two feedings, and if even the baby did not thrive then, further feedings should be substituted. Though the child received only two breast-feedings daily they should not be given up in early infancy. Again Dr. Reuben advised weaning babies at the age of eight months in two weeks time. This was too short a time for a baby that was thriving. The weaning should be gradual, extending from the ninth to the eleventh month. One should never take a young infant from the breast while there was any breast milk. The best plan was to utilize all the milk you had and then add the bottle to supplement the deficiency.

DR. HENRY D. CHAPIN said that there were two points in Dr. Reuben's paper of which he wished to speak. The one was in the line of Dr. Koplik's criticism. Dr. Reuben had said that if after a fair trial there was no gain in weight it was useless to continue trying to use the breast. The State Department of Agriculture had made investigations as to the milk supply of animals and had found that individual animals had their limit as to milk supply and that this could not be greatly altered by feeding and other measures directed toward securing an increase in the supply of milk. If a mother was in fair health, and her hygienic conditions were good, and diet failed to increase the supply, it was useless to expect much change.

The second point to be considered was in regard to the simple formulæ. A few years ago the formulæ became so complicated and each specialist had his own special formulæ which no one else could understand or remember and which he was liable to forget himself; now they were going to the other extreme and there was danger of the formulæ becoming too simple; the caloric idea was responsible for this. It was necessary that the food elements should be in the

right proportion, and it should be remembered that the food elements were not interchangeable, for instance, that carbohydrates could not be substituted for fats without destroying the proper proportion of the elements. It was to be feared that some of this simple feeding would result in a fine crop of rickets in the future.

DR. CHARLES HERRMAN said that frequently statistics were of little value, but those of the infant mortality as given by the Department of Health during the last few years could be considered accurate. Even if all births were not reported the percentage reported was very high and had not changed during these years. The important fact was that infant mortality rate had diminished regularly from year to year.

In order to obtain a more definite idea of how much an infant welfare station could accomplish the following experiment was made at the station of the Vanderbilt Clinic. Two square blocks in the immediate vicinity were chosen. The total infant mortality, the mortality from diarrheal diseases, from congenital debility and from respiratory diseases in these two blocks for the years 1907, 1908 and 1909 was known. In 1911 the station was established. It was found that there were ninety-five babies under one year of age in these two blocks but of these only 25 per cent. were registered at the station although it was so near the area selected for study. This emphasizes the absolute necessity of having a visiting nurse. After the station had been in operation for three years the infant mortality rate in this area would be computed and a comparison of conditions before and after the establishment of the station made.

In order to obtain the best results there should be a close association between the infant welfare station, the out-patient pediatric department, the babies' ward and the maternity ward, the last in order to obtain breast milk. At the Lebanon Hospital they were very fortunate in having all four departments together. When these departments were separated there was almost sure to be some lack of cooperation.

DR. THOMAS S. SOUTHWORTH could not quite agree with what Dr. Chapin had said in regard to taking the baby from the breast if it did not thrive after a fair trial. What was a fair trial? Every bit of breast milk that the child could get was of advantage. Many of Dr. Reuben's observations were most true, but he implied that the breast should be stopped when the child ceases to gain with complementary or supplementary feeding. This was an open question. Dr. Reuben was dealing with dispensary cases and had admitted that the supplementary feedings led to overfeeding and that this was the cause of the failure to get good results in his cases. Where the children were given the supplementary feedings in an intelligent way one could get as good results with them as with entirely artificial feeding. Further, after the age of eight or nine months they were not looking so much for a slightly larger gain in weight as for good general well-rounded development.

DR. L. E. LA FETRA said that the experiment carried on by Dr. Hoobler in his Bellevue wards had been very successful; since it was

demonstrated that good breast milk could be obtained by such a plan. Breast milk was frequently absolutely necessary to save the lives of premature and feeble infants, and Dr. Hoobler was deserving of much credit for his practical solution of a difficult problem.

The method described of making albumin milk with casein flour was easy compared with the older methods, and this was a distinct advantage.

Dr. La Fètra said he was interested in Dr. Reuben's careful study of infant feeding in dispensary babies. He believed that they were all agreed that mothers should be given every encouragement to nurse their babies in whole or in part; and that every ounce of breast milk should be conserved, except in those rare cases in which it acts as a poison. This principle should be adhered to, not simply because of the greater digestibility of breast milk, but because of the human protective principles that are carried over from the mother's blood.

DR. WILLIAM SHANNON stated that two years ago Dr. Jacobi, in speaking before the Section, had said that practically all mothers could nurse their infants. This was not so.

Dr. Shannon asked Dr. Baker if it was possible that the cool summer had been to any extent effective in modifying the statistics.

DR. J. FINLEY BELL, of Englewood, N. J., had been successful in interesting wealthy people in an effort to secure breast milk for hospital use and that his plan had worked very well. The cost had been about one-half as great as that named by Dr. Hoobler.

It seemed to him that possibly in many of the reports the results attributed to the education of the mothers were overdrawn. The mothers were many of them ignorant and unaccustomed to cleanliness, while the making up of a milk formula was rather a technical procedure. It did not seem possible that one could take such a woman and in a few lessons teach her to make up the milk formulæ and then to keep the milk properly. This was a factor that should be considered in refusing to give prepared milk to these mothers. It did not seem necessary to jeopardize the lives of the infants in order to educate the mothers. One weak point in the work had been that while the milk was prepared by the milk stations the mother was allowed to care for the nipples. In their work they had cared for the nipples and distributed them wrapped in waxed paper. They had cared for from twenty to thirty babies at a time and had had no case of sprue, and this he thought could not be said with the older methods.

Dr. Baker's formula which was passed around called for 280 calories and this would underfeed a baby of the age for which it was designed.

DR. GODFREY R. PISEK said that the feeling of antagonism toward the Board of Health's work in this direction had almost gone by and the profession realized that the Health Department was doing good and efficient work and physicians were ready and willing to cooperate with them.

DR. MARK S. REUBEN in closing the discussion said that the only reply that he could make to Dr. Koplik was that there was

not the slightest evidence to show that those infants fed on simple dilutions did not do as well as when fed on the complicated mixtures so popular a few years ago. The infants weaned at the eighth or ninth month, in the manner described, and fed thereafter artificially were not backward in development. Dr. Reuben said he had expected a "knock" in regard to what he said about stopping the breast feeding in early infancy. While he did not believe that the infant should be taken from the breast for any trivial reason there were certain cases in which the mother seemed to be in fair health, an analysis of the milk showed that it had the food elements in the right proportion and there was a sufficient quantity, yet the milk was toxic to the child. The child would not thrive while taking the mother's milk but as soon as it was stopped the infant would do well.

The speaker said that he wished to add his testimony that the success of the milk stations was largely due to the work of the nurses.

DR. S. JOSEPHINE BAKER, in closing the discussion, said that Dr. Haas had spoken of the delivery of milk to the homes rather than dispensing it at the milk stations. There was no question but that the milk was a bait to the mothers. The city would be very glad to get rid of the necessity of dispensing milk but without the milk the mothers would not come to the milk stations. Again, the milk companies would not deliver milk to the homes at the same reduced rate that they furnished it to the milk stations. The "Grade A certified milk" was delivered to the milk stations for eight cents a quart while if delivered at the homes it would cost fifteen cents a quart. Dr. Baker said she had understood Dr. Haas to say that 84 per cent. of the babies were breast fed; this could eliminate the necessity for dispensing milk and under such circumstances possibly home delivery might be effectual.

Dr. Reuben should be endorsed in what he had said regarding the simple dilutions of whole milk. They had been using these simple dilutions in the milk stations of the department with very satisfactory results.

In regard to the criticism of the formula on the blank passed around as being deficient in calories, it was distinctly stated that this was only a temporary expedient, employed until the infant was thoroughly examined and a formula suited to his individual needs prescribed. Dr. Baker said these formulæ had been gotten up about five years ago at her request by a committee of which Dr. Northrup was chairman.

As to the statistics of the city, of course they all agreed with the statement that they could not depend entirely on statistics. However, the statistics of Boston, Providence and New York had been accepted by the Federal authorities as reliable; they were the only cities in the United States whose statistics were thus accepted. But even if one discarded the birth registrations entirely, the actual numerical decrease in the number of deaths could be depended upon. If the same death rate had prevailed in 1912 that they had in 1907

there would have been about 6000 more deaths during 1912 than there were. The weather had been pretty much the same throughout the country during the past year. Returns from the other cities had not yet been fully received but, from the figures received earlier in the year, it would appear that New York City had a more marked decrease in its infant death rate than any other large city in the country. There seemed to be but one reason for this and that was the active systematic work that had been done by all the organizations interested in the reduction of infant mortality.

One of the speakers had questioned the possibility of teaching some mothers the home modification of milk; their experiences had shown that this was not only possible but eminently practical. This was a settled proposition as it had been tried on from 30,000 to 40,000 mothers during the previous year. There was a tendency to overestimate the influence of milk in the problem of infant mortality. Probably 20 per cent. of the mortality could be laid to the milk, while 80 per cent. was due to lack of general care and education.

It should not be forgotten that the good results were due to the excellent service of those doing the work, from the Chief inspector to the nurses and assistants. In such work as this one was apt to overlook the work of the individual.

In closing Dr. Baker invited the physicians to visit the milk stations, to ask questions and to offer criticisms.

BRIEF OF CURRENT LITERATURE.

DISEASES OF CHILDREN.

Congenital Dislocation of the Hip.—Reporting six cases, C. L. Washburne (*Phys. and Surg.*, 1913, xxxv, 306) says that adductor tenotomy weakens the anterior support to hip-joint favoring an anterior transposition of the femoral head and should be resorted to rarely. König's padded wedge as a fulcrum is a dangerous instrument favoring fracture of the femur, pressure paralysis of the sciatic nerve and bruising of the soft parts and should never be used. Pounding the adductor muscles loose from the pelvis with the fist or edge of hand favors anterior crural paralysis, fracture of the pelvis, and breaking of the skin, which may lead to deep sloughs and destruction of a large area. This method should be discarded. Well-developed children over six years of age, with two or more inches of shortening should have several weeks of extension treatment before attempting reduction. Reductions should not be undertaken in children under three years of age because of the difficulty encountered in keeping them clean and the greater dangers of injury to the delicate structures in and about the hip-joint. Reduction by manipulation in cases over ten years of age, with well-developed muscles and more than 2 inches shortening should not be undertaken and is attended with greater danger than the open operation.

Spasmodic Heredo-syphilitic Paraplegia in Children.—A. B. Marfan (*Arch. de méd. des enf.*, Aug., 1913) says that there are two groups of spasmodic paraplegias; the first, of congenital origin is described under the head of Little's disease; the second includes those that appear long after birth. Of the latter two forms are generally described, that resulting from the pressure of Pott's disease, and the spasmodic family paralysis of Strumpell. The author describes a third type under the name of heredo-syphilitic paraplegia of children. This paralysis always begins later than the fourth year; it comes on insidiously, beginning with a slight limp, and increasing in degree slowly. After a year or more the child becomes unable to attend school. The walk is difficult, stiff, the point of the foot dragging, and the child balancing from side to side. Flexion of thighs, knees and ankles is very incomplete; it is this incomplete flexion that causes the greatest difficulty in walking. There is a certain degree of equinus of the feet accompanied by a small amount of varus. The thighs approach each other, and the knees touch. When the patient is in repose this spasmodic rigidity is not shown. The legs are somewhat rotated and adducted; the reflexes are much exaggerated; the muscles are hard, and the tendon of Achilles is tense and contracted. The arms are normal. Sensibility is not altered; there is no pain; the vesical and anal sphincters functionate normally. There are no trophic disturbances, no muscular atrophy, no changes in the skin. There are ocular troubles, Argyll-Robertson pupils, and loss of visual acuity. The intellect is somewhat retarded. Bodily development is normal. The Wassermann reaction is always positive. There is no tendency to spontaneous cure, but progress is continuous though slow. This is a special clinical and anatomical type. There are diffuse lesions of meningomyelitis in all syphilitic diseases of the nervous system in adults or children. No autopsy has been made as yet in these cases, but clinical data would cause us to believe that the alterations are of the nature of a combined sclerosis of the spinal cord.

Summer Heat and Infant Mortality.—H. Rietschel (*Jahrbuch. f. Kinderheil.*, 1913, Bd. xxviii, H. 3) thinks that it is not the heat alone that affects infant mortality, but that by the heat all the various factors that tend to prevent nutrition are intensified and increased in their effect. The unhygienic surroundings among the poor, the lack of fresh air, and the feeding all have some effect for evil on the child. The heat increases the liability of the child to react to all sorts of bad influences and decreases the body resistance. Acute heat effects are coma, convulsions, hyperthermia, and vomiting. Chronic heat effects include increased fermentation and growth of bacteria in the intestine, failure to acquire immunity, changes in the composition of the perspiration, increase of liability of the skin to infection, danger of overfeeding, etc. The clinical picture varies from acute intoxication to simple summer diarrhea. All these effects are increased by the heat and their combination raises the summer mortality. An added factor is the infection of food, especially of milk.

Cardiac Disease in Childhood.—In a study of 104 cases of cardiac disease in childhood, C. H. Dunn (*Amer. Jour., Dis. Child.*, 1913, vi, 104) says that rheumatic fever is very much its commonest cause. Cases with acute rheumatic infection localized in the heart are much commoner than cases suffering from chronic endocarditis. Cardiac symptoms are due to two causes: first, acute infection localized in the heart; second, broken cardiac compensation. Of these two causes the first is the commoner. The liability of children to recurrent attacks of acute rheumatic infection, in any of which the heart may be involved, is very great. The immediate mortality of rheumatic cardiac disease is about 20 per cent. The subsequent mortality of patients with endocarditis of rheumatic origin, followed for at least ten years is about 50 per cent. The final mortality of rheumatic fever followed for at least ten years is 60 per cent. The mortality is seen chiefly during childhood. The mortality after young adult life is reached falls to only 7 per cent. The cause of death is heart failure. The cause of the heart failure may be either acute cardiac infection or broken compensation. In childhood the former causes is far the more common. After adult life is reached the latter cause is more common. The particular valvular lesion present has little or no relation either to the mortality or the amount of disability in adult life; except that aortic disease appears to be a particularly fatal lesion in childhood. The causes of the great mortality of rheumatic fever in children are, first, their greater liability to this infection; second, their greater liability to recurrent attacks; third, their greater liability to cardiac involvement. Patients who escape the dangers of childhood, and who enter adult life, are apt to show a remarkable freedom from disability. The majority of such patients can lead normal active lives. The probable cause of this freedom from disability lies in the fact that the cardiac damage occurs during the period of growth, and during this period a particularly perfect adaptation can take place between the heart and the patient, which enables the heart to meet the demands made on it. This adaptation is more perfect than can be attained in the adult. The earlier in life the cardiac lesion is acquired, the better is apt to be the result in adult life, as concerns ability to lead an active, normal existence; provided that the patient escapes the dangers of childhood. Treatment should be directed toward favoring the adaptation of child and heart. While guarding against overstrain, we must avoid too great limiting of the normal activities of childhood. In congenital cardiac disease, open ductus arteriosus is a favorable lesion.

Diagnosis and Treatment of Pyelitis in Infancy.—According to R. G. Freeman (*Amer. Jour. Dis. Child.*, 1913, vi, 117) pyelitis in infancy, due to the invasion of the pelvis of the kidney with colon bacteria resulting in a purulent inflammation, can apparently occur with no perceptible rise of temperature at any time. These cases should be treated and cured by the means ordinarily used in pyelitis. The alkaline treatment of pyelitis, while it is safe and will control many cases, is markedly less efficient than other methods of treat-

ment. Vaccines, either autogenous or commercial, are useful in controlling the constitutional symptoms of pyelitis. Hexamethylenamin, while sometimes effective in doses of from $1/2$ to 2 grains several times a day, will not in these doses cure certain cases which may be controlled by very large doses. Hexamethylenamin should always be administered in small doses first, but the dose should be rapidly run up, the child and its urine being carefully watched for symptoms of irritation of the kidneys. Large doses of hexamethylenamin should not usually be continued for more than a week at a time, and then after several days without any treatment or with alkaline treatment it should be started at the maximum dose given before and the amount increased daily until an influence on the urine is obtained. Doses of 25 grains daily in a child of six months, and from 35 to 45 grains a day in a child from nine to twelve months may be safely given in this way to some infants.

Measles.—A statistical study by C. V. Craster (*Amer. Journ. Dis. Child.*, 1913, vi, 121) of 1000 cases of epidemic measles occurring among emigrant children treated at Hoffman Island Isolation Hospital during nine months of 1910–1911, shows that the greatest number were in the month of June (186). The third year age period shows the greatest incidence of attack (195). The largest complication percentage, 81.3, and case mortality, 34.3 per cent., are found in the first year period. The seasonal prevalence of complication was highest in December, 78.6 per cent., and of case mortality in January, 25.2 per cent. The most frequent complication was otitis media, 495. The most common cause of death, bronchopneumonia with enteritis, was responsible for 23.3 per cent. of total deaths. Average duration of the fever was four days. The onset of purulent otitis media on the tenth or twelfth days may not be attended by unusual fever. If the temperature remains high after the fourth day, a possible grave complication is imminent. An initial high temperature does not necessarily point to a possible severe attack.

Attempts to Transmit Poliomyelitis by Means of the Stable-fly. (*Stomoxys Calcitrans*).—In a series of seven experiments in which the conditions were varied, W. A. Sawyer and W. B. Herms (*Jour. A. M. A.*, 1913, lxi, 461) were unable to transmit poliomyelitis from monkey to monkey through the agency of the stable-fly. Further experimentation may reveal conditions under which the stable-fly can readily transfer poliomyelitis, but the negative results of the writers' work and of the second set of experiments of Anderson and Frost lead to doubt that the fly is the usual agent in spreading the disease in nature. On the basis of the evidence now at hand we should continue to isolate persons sick with poliomyelitis or convalescent, and attempt to limit the formation of human carriers and to detect and control them. Screening of sick-rooms against the stable-fly and other flying insects is a precaution which should be added to those directed against contact infection, but not substituted for them. The measures used in suppressing the house-fly are not applicable to the control of the stable-fly owing to its different breeding habits and food supply. Methods should be devised for

diminishing the numbers of stable-flies as they are a great annoyance to cattle and, in all probability, are capable of transferring and inoculating a number of the diseases of animals.

Fatal Illness in Children Associated with Acute Interstitial Parotitis.—M. H. Gordon (*Lancet*, Aug. 2, 1913) describes four cases under observation in the postmortem room at St. Bartholomew's Hospital during the past few months. All were children. All had died after a short illness in which the symptoms pointed to meningoencephalitis. Postmortem, meningeal congestion was found in all the cases, and in two of them there was flattening of the convolutions and other evidence of increased intracranial pressure. In all alike no pus was present in the meninges. There was no evidence of tuberculosis in the meninges, brain, or elsewhere. The cerebrospinal fluid was clear and contained an excess of lymphocytes, but no visible bacteria. Sections of the cerebral cortex and of the cord failed on microscopic examination to yield histological evidence sufficient to justify a diagnosis of poliomyelitis. The lymphatic glands both in the neck and mesentery were swollen. In two cases the lymphoid tissue in the small intestine was more prominent than usual, this change being most marked in Peyer's patches in one case, and in the solitary follicles in the other. In two of the cases petechial hemorrhages were seen; in the first in the parietal pleura and visceral pericardium, and in the second on the under surface of the liver and beneath the capsule of the kidneys. In all the children both heart's blood and cerebrospinal fluid failed to show growth on agar. Although the salivary glands were not obviously enlarged and had given rise to no symptoms, they were found in all the four children to show on histological examination foci of acute inflammation—chiefly interstitial in distribution. The writer believes that these children met their death as the result of the unusual action of the virus of mumps.

Lactic-acid Bacillus Spray for Diphtheria.—H. B. Wood (*Jour. A. M. A.*, 1913, lxi, 392) reports that after antitoxin and local antiseptic applications had proven ineffectual in clearing the throat of diphtheria bacilli, this result was attained after spraying with a lactic-acid bacillus culture. In a carrier the negative cultures were obtained after spraying for one week. From three cases, sprayed one noon, the next noon and the same evening, cultures were made the following morning, no diphtheria bacilli being found; without further spraying the second negative culture was obtained two days later. In another case the lactic-acid bacillus spray was used three times within thirty hours, the membrane rapidly decreasing and practically disappearing within three days with negative cultures. When unexpectedly encountering a case of rural diphtheria, the physician, if without antitoxin or antiseptics, may perhaps find some advantage in swabbing or douching the nose and throat with ordinary sour milk.

Mental Deficiency and Delinquency.—Olga Bridgman (*Jour. A. M. A.*, 1913, lxi, 471) finds that of 104 girls committed to the State Training School for Girls at Geneva as sexual delinquents, 101, or

97 per cent., were feeble-minded according to the Binet tests. This would seem to prove mental deficiency to be an important causative factor in the causation of sexual immorality and to indicate the routine employment of a mental examination for all children of this class in order to determine how far they may be held responsible. Of the feeble-minded, comparatively few are aggressive sexual perverts, but most are helpless victims, who should have protection, and who, under close supervision, may lead useful, contented lives. By no means all delinquent girls are feeble-minded, but probably those not amenable to supervision and direction in their own homes are largely so.

Blood Pressure in Infants, Especially in Gastroenteritis.—In twenty-five cases of gastroenteritis, H. K. Hill (*Arch. Pediatrics*, 1913, xxx, 588) found a higher blood pressure than others have claimed. He used the Nicholson sphygmomanometer with the cuff folded exactly in half and applied to the thigh so as to excite the infant as little as possible. The auscultatory method was employed. The pulse pressure, which is the difference between the systolic and diastolic pressures, was less in most of the cases which died, although there were many exceptions. The pulse pressure has much more significance than the systolic blood pressure alone, a point insisted upon by Nicholson, and is not influenced by the size of the cuff or whether the systolic blood pressure is high or low, but by the relation of the systolic to the diastolic pressure in each case. Blood pressure in infants can never have the same importance that it has in adults, principally because of the absence of arteriosclerosis and its causes, or even in young children, although the effect of toxicity must surely have great influence upon the blood pressure in infants as well as at any other age of life.

Summer Diarrhea of Children.—In over 300 cases examined clinically and bacteriologically, R. L. Forsyth (*Australian Med. Jour.*, Aug. 16, 1913) found five main types of bacilli: (1) The Shiga-Flexner type, in 25 per cent. of the total number, but in the last two years with more skilled work found in 33 per cent.; (2) the Gaertner type, in 24 per cent.; (3) the slow fermenter, pure or mixed with other classes, in 26 per cent.; (4) the Morgan, in 7 per cent., but absent altogether for one season; (5) various liquefiers of gelatine. These five classes occurred in 80 per cent. of the cases examined. The symptom complex caused by some of these organisms is so characteristic that one can often diagnose the type of infection by the appearance and symptoms and fairly constant pathological changes are found in these cases. In the Shiga-Flexner type the onset is very acute, with diarrhea severely marked, and often blood-stained motions; the temperature is certainly raised for a week, and perhaps for fourteen days. In three or four weeks the extreme symptoms have vanished and the child is merely a "difficult feeding" case. The urgent symptoms subside or the baby dies. The mortality is 66 per cent. In this type the intestine is thickened, the large bowel and the last foot or so of the small bowel are affected. The lymphoid structures are picked out, and often the lymphoid patches are ulcerated,

and the mucous membrane eroded and covered with a sticky débris. The spleen and glands are swollen. In the Gaertner infections a very few are extremely acute, and these die in a day or two with great toxemia and profuse watery stools. These are probably not pure Gaertner infections. The majority of the Gaertner infections are chronic troubles. By the time they are diagnosed and admitted the baby is fairly exhausted and wasted. The duration of the trouble is seven or eight weeks; much longer than the Shiga infection. Postmortem almost the whole of the intestine is affected. The bowel is almost transparent, the lymphoid structures are not particularly picked out, the spleen and glands are not enlarged. In the slow fermenter cases the child is extremely ill and differs little, if at all, from the Gaertner type clinically, but the bacillus isolated ferments lactose in seven, ten or even fourteen days. It has a great deal of virulence, and is probably capable of producing a gastroenteritis, but its favorite rôle is that of "jackal," after the trouble has been started by other germs.

Comparative Value of Various Sugars in Feeding of Infants.—C. C. Haskell (*Arch. Pediatrics*, 1913, xxx, 572) has studied the effects of different sugars in feeding a series of infants at the Seaside Hospital of St. John's Guild. These infants were either convalescent from more or less severe gastroenteric disturbance or were suffering from mild, more or less chronic forms. The sugars used were commercial lactose, commercial saccharose, pure maltose, 80 per cent. maltose with 20 per cent. of dextrin, dextri-maltose, and malt-soup extract. The greatest sum total weight increase occurred in the series of infants fed on mixtures containing malt-soup extract, while the greatest total loss occurred in the lactose-fed series. Mere increase in weight alone is not a reliable index of progress. When, however, the state of the stools is good and the infant's general condition satisfactory, more trustworthy conclusions may be drawn. Of the three sugars considered, malt-soup extract was distinctly superior in all three respects, while dextri-maltose is decidedly of less value than lactose. Pure maltose, saccharose, and 80 per cent. maltose are dismissed from consideration until more observations are made. The evidence presented has no bearing upon the selection of a sugar for feeding "normal" infants.

Dyspituitarism.—Reviewing the literature of dyspituitarism, including experimental work on dogs, M. S. Reuben (*Amer. Jour. Dis. Child.*, 1913, vi, 145) says that the symptoms of dyspituitarism in man resolve themselves into those due to, (1) hypo- or hypersecretion or perversion of secretion of the gland itself; (2) those due to increased cerebral pressure; (3) those due to the local pressure of the tumor, and (4) those due to the involvement of the other ductless glands. Deficiency of anterior lobe in children leads to infantilism; there is inhibition of skeletal development. Hypersecretion of the anterior lobe leads to gigantism in cases in which the epiphyseal centers have not yet ossified, and to acromegaly in adults. In hyperpituitarism there is hypertrophic alteration of the skin, and increase in size of the hair follicles; there is also hypertrophy of the papillæ and

activation of the secretory glands so that the skin becomes greasy and moist; hypertrichosis is marked. Deficiency of posterior lobe is usually associated with adiposity and increased sugar tolerance; the temperature is usually subnormal, and the subjective chilliness and drowsiness indicate diminished metabolism. The skin is usually smooth; may even suggest edema, but does not pit; hair on the scalp may be abundant, but axillary and pubic hair may be entirely wanting; the nails are often small and do not show the crescent at their base; constipation is often obstinate and usually improves on glandular therapy; psychic disturbances are frequent and are usually due to involvement of frontal and temporal lobes. The symptoms of cerebral involvement are, change in disposition, enfeeblement of memory, disorientation and "notable always is the utter lack of appreciation of, and complete indifference to, the existing condition." In hyperpituitarism, temperamental changes, wakefulness, lack of concentration and irritability are more common; in hypopituitarism mild psychoses to extreme mental derangements with epilepsy are not infrequent. The physiological connection of all the ductless glands is an intimate one, and in pathological conditions of one of them all the other glands are affected. The following symptoms present in dyspituitarism are referable to secondary involvement of the other ductless glands: Imperfectly acquired secondary sexual characteristics in cases in which the lesion antedates puberty, and of resultant amenorrhea or impotence with retrogressive sexual changes, when the malady develops after the acquirement of adolescence; pigmentation of the skin, asthenia, low blood pressure and hypoglycemia point to adrenal involvement. Disturbances of the pituitary may be primary or secondary, functional or organic. The primary organic disturbances may be due to hyperplasia of the gland, to tumors of the gland or to tumors arising in the neighborhood of the pituitary, and which compress it and alter its secretion; such tumors usually do not cause acromegaly; any tumor of the brain or anything which prevents the secretion of this gland (*e.g.*, hydrocephalus) from entering the third ventricle, may cause symptoms of dyspituitarism. The chief types of dyspituitarism are (1) acromegaly, (2) cases with neighborhood symptoms of tumor of the hypophysis without evidence of acromegaly, (3) those which, in addition to local signs of hypophyseal tumor and signs of posterior lobe insufficiency, show marked dwarfism. As Cushing has shown that a pituitary may be hypersecreting at one time and hyposecreting at another; and in fact all cases of hyperpituitarism show evidences of hypopituitarism as the disease progresses. He also made the observation that one lobe may be hypersecreting and the other lobe hyposecreting at the same time; and thus we may have a variety of mixed types. He especially called attention to cases of skeletal overgrowth associated with adiposity and sexual infantilism without acromegaly. Diagnosis of acromegaly and gigantism is simple; the Röntgen rays, however, are of great aid. They may show an enlarged sella turcica, or they may show enlargement, broadening and tufting of the phalanges. In

posterior lobe insufficiency, the estimation of the sugar tolerance is of importance. We must always suspect posterior lobe insufficiency in individuals who can take more than 150 grams glucose and 100 grams levulose by mouth without glycosuria. In some cases of anterior lobe hyposecretion there is a thermic response when they receive an injection of anterior lobe extract. The symptom-complex of skeletal overgrowth or dwarfism, adiposity, genital atrophy, optic nerve atrophy, deformation of sella and increased carbohydrate tolerance are absolutely pathognomonic of dyspituitarism. Treatment may be medical, surgical or both; surgical intervention is indicated to relieve general central pressure; to relieve neighborhood symptoms and to implant pituitary gland in cases of hyposecretion. To relieve general cerebral pressure symptoms a subtemporal decompression is indicated; for the neighborhood symptoms, fragmentary extirpation of the tumor or removal of the sellar floor and opening of the capsule are the operations of choice in the absence of pressure symptoms, but when headaches are very severe a sellar decompression should be advised. The medical treatment consists in the application of radium after operation and the administration of whole gland extract by mouth or hypodermically, the dose varying in each case, depending on the amount of posterior lobe insufficiency. In a case reported by the author, under treatment with 10 grains of pituitary extract (whole gland) three times a day, no glycosuria appeared; the temperature, subnormal before treatment, never ranged lower than 99° F.; constipation was much relieved; the pulse ranged from 85 to 100; the patient lost 10 pounds in two months; treatment had no effect on the headaches, vertigo or vomiting; a sellar decompression was suggested, but was refused. The presence of genital hypoplasia, hypotrichosis, adiposis, skeletal undergrowth, with symptoms of cerebral pressure and an enlarged sella turcica, led the author to conclude that he was dealing with a case of hyposecretion of both lobes (type Fröhlich), probably due to a tumorous growth. The presence of slight exophthalmos, tachycardia and tremor suggested the presence of hyperthyroidism, secondary and probably of a compensatory nature, as the thyroid and the pituitary are synergic.

Initial Localization of Pulmonary Tuberculosis in Children.—

Charles Lenoux (*Arch. de méd. des enf.*, Sept., 1913) says that in the nursling and the young child it is not toward the apex but toward the base or the middle of the lung that we should seek for early signs of infection in most cases of tuberculosis. Clinical examination is not sufficient to show this focus; physical signs are absent, and only radiography and radioscopy are of assistance. The new-born child and the nursling resist tuberculosis badly; it is only at two years and over that we can follow its ulterior evolution. By repetition of clinical and radioscopic examinations in the same child for months and years is it possible to follow the evolution of tuberculosis of the lungs and lymph nodes which consists of three stages, rapid or slow. There is infection of a lung in some location, base, middle, rarely

apex, adenopathy at first single, then double. Next there is tracheo-bronchial adenopathy, more or less latent, lasting some months or years. Next comes a phase of reinfection of the apex, and classical evolution of chronic pulmonary tuberculosis. It is the early infection of the young child that brings about many of the tuberculoses of the adolescent and even the adult, through tardy reinfection of the apex. In larger children, especially at twelve years or more, we may observe an inverse evolution. In these cases the infection seems to begin, as in the adult, at the apex; here the adenopathy is secondary and more or less late.

Clinical History of Scarlatina of Wounds.—Hans Hahn (*Monats-schr., f. Kinderheil.*, 1913, Bd. xii, H. 5) gives an account of a small epidemic of scarlet fever beginning in wounds of various kinds; some were burns, some cuts, and others cases of operation for empyema, etc. In the rapid outbreak of surgical scarlet fever in the clinic the surroundings took a large part. The empyema cases were all operated on in the clinic, and soon became infected. The other children came from the surgical wards and were operated on in the same room. There were in all seventeen cases of surgical scarlet fever. The cases began with a sudden rise of temperature, and sometimes a chill. In only a few cases was there vomiting. The exanthem began about the wound, and in some cases spread but little. The wound became reddened, swollen, gaping, macerated, and freely secreting. On the same evening or next morning a fine rash began about the wound. The mouth showed a rash on the cheeks and gums, but the tonsils were not swollen, showed no membrane and the cervical lymphatic glands were not enlarged. The glands near the wound were enlarged, however. The tongue showed the typical strawberry appearance. There was ear trouble in only one case. There was no albumin in the urine and no casts or blood cells. Rheumatoid and heart affections were never seen. The wounds healed kindly with primary union. The prognosis seems not to be bad in these cases, the general symptoms being lighter than in ordinary cases of scarlet fever. Death resulted from the primary surgical condition, not from the scarlatina. We appear to have had here extrabuccal inoculations of a not very virulent virus.

Etiology of Spinal Paralysis in Children.—J. Bruno (*Münch. med. Woch.*, Sept. 9, 1913) gives observations on the spread of infantile paralysis made by himself in an epidemic, which go to show that the disease is common among domestic animals and is communicated from them to the human species. He believes that mild cases of the disease and carriers of the poison in the nasal mucous membrane are responsible for much of the spread of the disease. The intestine also carries the bacilli. Dust, smut, lifeless materials, clothing, and shoes may also play a part in its spread. Fleas, lice, and bedbugs more rarely carry the contagion. Sheppard has shown in Boston that of 110 houses infected by poliomyelitis thirty-four had dogs, cats, hens, or horses in them which died with symptoms of paralysis. The author relates a case in which the parents lived in a

large estate enclosed with a fence, outside of which the children never went. Contact with other children is here excluded. The father had in this large garden numbers of animals of all kinds, which ran about freely in the enclosure. The father got some new ducks from another town. They soon began to die with so-called "rheumatism." They became unable to walk before death. Two cases of poliomyelitis in children two and three years of age later developed in this family. The entire family, father, mother, sister of the mother, and the maid servant were sick for some days, most of them with gastrointestinal troubles, pain in the abdomen, and severe rheumatic and back pains. The preventive measures for this kind of infection are hygienic for the animals and man. The hands should be carefully disinfected after touching animals, and the animals have frequent baths and brushing with antiseptic solutions. The mouth and nose should be disinfected with formamint and peroxide.

Appearance of Diphtheria Bacilli in the Urine.—E. Freifeld (*Berl. klin. Woch.*, Sept. 22, 1913) believes that we have evidence that diphtheria is not a localized infection but a generalized disease. From his own observations he states that diphtheria bacilli are not infrequently found in the urine, and not only in the septic cases but also in relatively light forms. Their presence may last for a long time. The presence of the bacilli in the urine is of importance in the spread of epidemics of the disease. A case of secondary infection of the urinary bladder, described by the author, must be a very rare condition. The urinary sediment remaining in vessels after the urine has been emptied may be a prolific source of contagion. Differentiation of the Klebs-Loeffler and the pseudodiphtheria bacillus may be made by the use of litmus and experiments in animals.

Icterus Neonatorum and Secretion of the Bile Coloring Matters in the Fetus and the New-born.—Arvo Ylppo (*Münch. med. Woch.*, Sept. 30, 1913) has made experiments on the secretion of bile coloring matters in the new-born. He finds that icterus in the new-born is not affected by infections. In severe congenital syphilis he has often seen the icterus disappear. The same is the case in septic and intestinal troubles. The conclusions arrived at are that icterus neonatorum is of purely hepatic origin. The hematogenous factor plays no rôle here. The icteric new-born child shows no greater amount of coloring matter in the blood than the nonicteric one. Icterus neonatorum results from the fact that after birth the liver allows a part of the bile coloring matters to pass into the blood just as the fetal liver did. Icterus neonatorum is a usual physiological condition which may go on to a pathological degree. It is not influenced by other outside factors.

Gastrointestinal Hemorrhages in two Infants Suckled by one Mother.—A. Bonnet-Labordière (*Bull. de la Soc. Belge de gyn.*, June, 1913) details a case of apparent infection in a new-born child from the milk of its mother, which caused gastrointestinal hemor-

rhages of such severity that feeding had to be stopped. The milk was then given to another infant, of another woman, whose milk was deficient. It produced in the second infant the same effects of hemorrhage but in less degree, with fever. Examination of this milk showed that while the proportion of fat was much reduced, that of casein was much increased. Perhaps so concentrated a milk caused such gastrointestinal irritation as to produce extravasation of blood into the intestine. The condition began when the breasts filled up with milk, the colostrum having caused no trouble. Violent and exaggerated peristaltic movements might have assisted in causing the hemorrhage.

Nephritic Heart Anomalies in the Course of Scarlet Fever and their Treatment.—Adolf Baginsky (*Berl. klin. Woch.*, Oct. 20, 1913) gives histories of two cases in which dilatation of the heart and other cardiac symptoms occurred in the course of scarlet fever, in which it was found that there was a severe kidney lesion with albumin, casts and blood in the urine. He believes that the kidney condition is the primary cause of these symptoms. In these cases there are marked edema of all the tissues and edema of the lungs. The dilatation of the heart is acute. The proper treatment of such a condition is by digitalis and heart tonics combined with diuretics, and sweat baths to remove the edema.

The Endocranian Functions During Fetal and Embryonic Life.—C. J. Parhon (*Presse med.*, Oct., 1913) says that the function of the glands of internal secretion is most important during the epoch of development. They bear the greater part of the burden of the building up of the new being during embryonic and fetal life. Certain symptoms of thyroid aplasia indicate a failure and arrest of development at a certain time in fetal life and merit the name of fetalism. In a number of congenital dystrophies, such as periosteal dysplasia, cleidocranial dysostosis, and achondroplasia we are obliged to consider this failure of the glands of internal secretion. The author wishes especially to speak of the rôle of these glands in organogenesis and histogenesis. Here we may cite the troubles of dentition seen in congenital myxedema due to imperfect development of the organs during extrauterine life. The most brilliant example is offered by the development of the mammary gland. This is undeveloped in infants of both sexes and in the normal man. It develops only at puberty in women and its formation is affected by the condition of the ovaries. Castration prevents the formation of the breasts. The thyroid also plays a part in the development of the genital organs, testicles and ovaries. The study of the effect of these glands in fetal and embryonic life is difficult. Experiments can be made only on lower animals. The other method of study is by examination of teratological specimens and seeking whether there is a relation of absence of development to the failure to develop of some one of these glands. We know of the coexistence of anencephaly with aplasia of the suprarenal capsules. This may be the result of absence of a hormone which the cerebral cells emit during the

formative period. Perhaps certain cells or certain glands emit hormones, that are plastic or formative, to organs to which later they will be antagonistic. During the formation period the function is absent and when the function becomes established the development of the organ undergoes a slowing arrest of development.

Fatal Cases of Eczema in Children.—P. S. Hitchens (*Brit. Jour. Child. Dis.*, 1913, x, 395) has treated twenty-eight cases of eczema of which six ended fatally. The first and the fifth cases were in the hospital such a short time that not much can be said about them, and of the fourth case it might be said that the diarrhea and vomiting, which came on just before and apparently caused the fatal issue, were intercurrent affections and quite enough in themselves to carry off a weakly child. In the second case the recovery from the eczema was rather unusually rapid, and all seemed to be going on to a completely successful issue, when without any warning all the phenomena of shock with collapse developed and the patient died in the course of a few hours. In the third case the recovery from the eczema was much more gradual, but on recovery the same symptoms supervened, though the fatal issue was not quite so rapid and was accompanied with symptoms of cerebral irritation. In these cases the writer does not think the treatment can have caused sufficient absorption of metallic poisons to cause death. He also questions the occurrence of status lymphaticus. He now warns mothers that their children may possibly be better with eczema than without it, and that its cure is not always an unmixed blessing.

Wassermann Reaction in Infants.—The results in a series of cases examined by K. D. Blackfan and S. T. Nicholson, Jr. (*Amer. Jour. Dis. Child.*, 1913, vi, 162), in which only two cases out of 101 ordinary hospital patients gave a positive serum reaction, are strikingly low as compared with the thirty-nine positive cases found by Churchill in 101 children taken "mostly at random" from a large hospital for children. Consequently they do not confirm his observations regarding the frequency of hereditary syphilis among hospital children. Several factors concerning the complement fixation test should be kept in mind as a possible explanation for such a wide variation, viz., the hypersensitiveness of the Noguchi as compared to the Wassermann technic; the personal element present in the interpretation of the reaction and the possibility of error in technic.

These two investigations show conclusively that small series from different sources give widely divergent results, and that further studies of larger series of cases are necessary in order to determine the prevalence of hereditary syphilis among hospital children.

Wassermann Reaction in Hereditary Syphilis, Congenital Deformities, and other Conditions in Infancy.—L. E. Holt (*Amer. Jour. Dis. Child.*, 1913, vi, 166) finds that cases of hereditary syphilis almost invariably respond positively to the Wassermann test, even when previously treated by mercury, unless the treatment has been very thorough and protracted. After the use of salvarsan it disappears much more regularly and earlier, but even then in

most cases only after repeated injections. Of 178 tests made in hospital patients showing no definite signs of syphilis, positive reactions were obtained in but eleven and five of these were shown on fuller investigation or subsequent findings to be pretty clearly syphilitic. Two of the remaining six were doubtfully so. The great portion of congenital deformities have no relation to syphilis, since not a single positive reaction was obtained in fifty-six consecutive cases. Of sixty-two patients suffering from malnutrition or marasmus, only five gave a positive reaction, and are included in the group above mentioned. Of the remaining fifty-seven, nearly one-third had very considerable enlargement of the spleen or liver, or both. Since the cases examined were selected from a much larger number, as those most likely to be syphilitic, we cannot regard syphilis as a common cause of marasmus, certainly in the patients admitted to the Babies' Hospital. Since the error, when one exists, is almost invariably on the positive side, the technic of those who find a very large proportion of positive reactions among marasmus patients in institutions is open to suspicion.

Luetin Reaction in Infancy.—Noguchi, using pure cultures of numerous strains of the *Spirochete pallida* grown on solid media and then ground in a mortar, has produced the substance known as luetin. This is preserved in 0.5 per cent. trikresol. The skin is prepared as for the tuberculin skin test. The site chosen for injection is preferably the outer side of the upper arm, and the control, which consists of ground agar preserved in 0.5 per cent. trikresol, is injected into the opposite arm. The injection in each instance should be made intradermally, 0.05 c.c. being used. If the injection has been properly made the epidermis is raised to form a pale circle which disappears within a half hour; this happens with both the luetin and control. With the injection used for control there is seen within eighteen to twenty-four hours a slight erythema around the point of puncture which disappears within two days. Where the luetin is injected there occurs within one to two days a red indurated papule, which slowly increases during the following four to five days, and then subsides, leaving a brown desquamating induration. This slowly disappears in the course of a few weeks. Occasionally, the indurated papule may go on to pustule formation. In all, 134 tests have been made at the Babies' Hospital and are reported by A. Brown (*Amer. Jour. Dis. Child.*, 1913, vi, 171). Thirty-four were in patients with hereditary syphilis, and 100 in controls. Of the syphilitic infants all but four gave a positive luetin reaction. In the 100 controls, ninety-six were definitely negative and four gave a doubtful reaction. All of the negative cases were also negative to the Wassermann test. In all the cases regarded as syphilitic the diagnosis was confirmed by the Wassermann reaction and the clinical history. These observations indicate that the luetin cutaneous reaction is a valuable addition to the means of diagnosis of hereditary syphilis. The luetin test has the obvious advantage that it can be readily applied anywhere by anyone and the

technic is comparatively simple. The interpretation of the reaction requires considerable experience, but with this the number of doubtful reactions is small.

Results with Salvarsan in Hereditary Syphilis.—During the period extending from November, 1911, to January, 1913, there were treated in the Babies' Hospital thirty-four cases of hereditary syphilis by salvarsan alone, injections given intravenously at the bend of the elbow. In estimating the effects of salvarsan in hereditary syphilis they have considered its influence on the spirochetes, the Wassermann reaction, the rash and other syphilitic symptoms and the patient's general condition. L. E. Holt and A. Brown (*Amer. Jour. Dis. Child.*, 1913, vi, 174) have found that immediate and striking benefit follows the injection of salvarsan in hereditary syphilis, and this is seen in many patients in whom mercury has been used with little or no apparent benefit. Salvarsan must be given intravenously; with proper technic its administration is not difficult and it is practically free from danger. A single dose of salvarsan does not cure hereditary syphilis, although it often removes the visible symptoms. Relapses, however, are to be expected unless the dose is repeated. With present experience it seems advisable to repeat the injections at intervals for one year, even though no symptoms are present. The best results in hereditary syphilis are undoubtedly obtained by the early use of salvarsan followed by mercurial treatment. Even with the aid of the Wassermann reaction it is difficult to say when a child with hereditary syphilis is actually cured.

Amebic Dysentery in Very Young Children.—A. Lasage and C. Bobillier (*Jour. de m d. de Paris*, Nos. 36 and 38, 1913) say that there are two principal varieties of dysentery: one produced by ameb  and the other by bacilli. The disease produced by the ameba is found in adults even in temperate countries. It is very rare even in tropical countries under the age of two years. Exceptionally it is seen in France at that age, therefore one should examine the stools and look for the ameba in all cases of diarrhea. The specific ameba both in adults and in infants is usually the *Ameba tetragena* of Viereck, rarely *Ameba hystolytica* of Schaudinn. Up to the present time it has been impossible to successfully cultivate these two pathogenic ameb , although they are inoculable in the cat. The cultivated species are saprophytes inoffensive in man and cannot be inoculated in the cat. Emetine is the best treatment for all amebic affections. The dose is 0.1 repeated twice daily, and is perfectly tolerated and sufficiently active at the age of twenty-three months. The diagnosis should not be made except by the finding of the organisms in the stools. The symptoms are intermittent abdominal pains of great severity before each stool, while in the interval the child seems quite well. The tenesmus is very painful and lasts some time after the evacuation. The stools are mostly composed of bloody mucus. They may be even thirty to forty per day.

Magnesium Treatment of Spasmophile Convulsions.—Nikolaus Berend (*Monatsschr. f. Kinderheil.*, Bd. xii, No. 6, 1913) considers the various theories which have been brought forward as to the cause of spasmophilia. The oldest, of Hassowitz, was that tetanus is a nervous symptom complex of rickets. Stoelzner believed it to be due to a disturbance of calcium content of the tissues. Quest thought that a change in the calcium content of the brain caused increased irritability of the brain, even sufficient to cause convulsions. Another theory was that convulsions were due to disturbances of the functions of the ductless glands. The author has found no pathological changes regularly present in the glands in children who died of tetanus. He has found that defective calcium and magnesium content of the tissues increases irritability and convulsions ensue. The use of calcium by hypodermic injection in convulsions has been tried, but has caused severe infiltration of the tissues. Magnesium has not this effect, while it does cause a lessening of irritability. It was believed that it was too poisonous a substance to be used in this way in young infants. But the author finds that with an initial dose of 0.20 per kilogram of weight in dogs no poisonous effects are caused. In infants twice this dose may be given without bad effects. Up to the present time that author has treated by this method forty cases, twenty-five of spasmophile convulsions, and fifteen of ordinary convulsions. He gives detailed histories of all these cases. He then considers the effect of the treatment, first on the electrical irritability. He found this irritability decreased immediately after the injection was given, but this effect lasted only a few hours. Control cases among normal children also showed this lessened irritability. In no case was irritability increased after magnesium.

The effect on the spasm of the glottis was shown in eight cases, a lessening in number and severity of the spasms being seen. In several cases after two or three injections the cyanosis was less and of shorter duration. None of the cases treated died of spasm of the glottis. Fifteen cases of uncomplicated tetanic convulsions all were benefitted by the magnesium injections. In two to three hours after the injections the convulsions ceased in many cases. In no case did they last more than four days after the injections. In latent tetanus, the Trousseau symptoms, the effect was not so rapid. Of the twenty-five spasmophile convulsive cases, ten came in a status epilepticus. In two-thirds of the cases one or two injections caused the spasms to subside; and of thirteen cases a recurrence of spasms was observed in only three, and they were very brief. In convulsions due to such causes as infectious fevers, meningitis, and uremia, magnesium does no good and is not indicated. To sum up the author's results: magnesium influences most quickly the electrical irritability of the muscles and the convulsions involving the limbs, less quickly eclampsia, and the Trousseau symptom, least of all the laryngeal spasm. At the same time it does more good than any other treatment that he has used for this symptom. The duration of the tetanus is greatly reduced. Mother's milk is the best possible

diet in these cases. Artificial feeding is much more successful with the aid of magnesium injections than when used alone. After the emptying of the intestines with castor oil and magnesium injections, in twelve hours feeding with gruels is begun. The two dangers to the child are inanition and return of convulsions when milk feeding is begun. The use of gruels prevents death from inanition. Casein, milk, or small quantities of malt soups are useful. Later rice, water, cocoa, meat soups, and fruit juices are given.

Results of Treatment with Salvarsan in Late Congenital Syphilis.

—During the past year, G. S. Strathy and G. A. Campbell (*Amer. Jour. Dis. Child.*, 1913, vi, 187) have treated with salvarsan 18 children with congenital syphilis. All improved clinically under salvarsan treatment. The intensity of the Wassermann reaction diminished steadily with frequently repeated full doses, but in nine patients over four years, who received four doses or more, only two became negative and that after eight and nine doses. The younger the child, the more quickly does the Wassermann reaction become negative. Have not found the administration of salvarsan by intravenous injection in children to produce any bad effects.

Dangerous Middle Ear Suppuration.—I. W. Voorhees (*Arch. Pediatrics*, 1913, xxx, 644) emphasizes the point that, given a patient with a discharging ear, whether acute or chronic, if there is pain in the head, sleeplessness, disturbances of vision, loss of memory, nausea and vomiting, nystagmus or facial paralysis, one should not be content with prescribing a headache powder or a stomach mixture, but should refer the symptoms back to the probable cause in the ear.

Radiographic Studies of the Chest in Tuberculous Meningitis.—

The report by I. O. Woodruff (*Arch. Pediatrics*, 1913, xxx, 659) is based on fifteen cases of tuberculous meningitis from the children's medical words of Bellevue Hospital. A study of them suggests that the interpretation of the radiographic shadows in the chest in children and infants, when there is considerable tuberculous involvement of the lungs, can be relied upon, at any rate, to diagnose the nature of the pathologic process. Consequently, as there is usually considerable pulmonary involvement in tuberculous meningitis, this measure may be a distinct aid in the diagnosis of this disease; particularly in those cases in which the diagnosis is not absolutely certain, owing to the failure to find the tubercle bacilli in the spinal fluid, and in which the strongly corroborative evidence of a positive von Pirquet reaction is lacking. It would also seem likely that in children in whom, on clinical grounds, there is uncertainty regarding the presence of an early tuberculous involvement in the chest, the x-ray cannot be considered a deciding factor in the diagnosis; nor can it be relied upon even in more advanced cases to furnish accurate evidence of the exact pathologic lesion present.

Treatment of Diphtheria Carriers.—H. Albert (*Jour. A. M. A.* 1913, lxi, 1027) says that it is obvious from the large number of methods proposed for theremoval of diphtheria bacilli from diphtheria carriers

that no one method has proved satisfactory. The use of the various antiseptics, gargled or sprayed, is of doubtful value in relieving the carrier condition, although they no doubt destroy many of the germs with which they come in contact and therefore lessen the infectivity of the carrier. Good results have been obtained by the use of a spray of a culture of staphylococci. The writer has obtained his best results by the treatment of the crypts of the tonsils with a solution of silver nitrate (from 5 to 10 per cent.) applied by means of a thin flexible applicator, combined with a mild alkaline and antiseptic spray (such as Seiler's solution) for the nasal cavity, and a 1 per cent. solution of hydrogen peroxide as a mouth-wash and gargle.

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**THE ROLE OF ABDOMINAL CESAREAN SECTION IN THE
TREATMENT OF ECLAMPSIA.¹**

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It is my purpose this evening to set before you certain facts which I have gathered during the past three years regarding the treatment of antepartum eclampsia by abdominal Cesarean section. This information has been secured through a study of 500 published and unpublished cases of this operation performed upon eclamptic women, obtained through an exhaustive search of the literature and through the kindness of many operators in this country and abroad, who have been good enough to favor me with their unpublished cases. The cases have been tabulated just as they have been collected or received. When the number reached 500, which occurred only a week or two ago, the polls were closed, so to speak, since I felt that deductions as to the value of the operation might be made from this many operations with considerable confidence.

At the outset I desire to state that this study has been undertaken with no purpose of proving or disproving any theory or method of treating antepartum eclampsia. We are all aware how easy it is in any statistical study to pad the statistics. Excuses may easily be found to exclude fatal cases if one is trying to prove the efficiency of a certain line of treatment. But if one is to get at the facts, this is as sensible as cheating at solitaire which has been described as the last word as regards idiocy.

¹ Read at a meeting of the Philadelphia Obstetrical Society, December 4, 1913.

Only through statistical studies can we hope to be in a position to decide upon the best method of treating eclampsia under certain conditions. Since we are as yet in ignorance of the true cause of this most serious obstetric complication, treatment must of necessity be empirical. But since even in the largest clinics the number of cases of eclampsia is small in comparison with its prevalence the world over, one can not afford to draw conclusions as to the value of a certain treatment from his own experience or that of those about him. This, in explanation of why I have considered it necessary to spend much time and labor during the past five years in obtaining accurate information regarding the results of the treatment of antepartum eclampsia in over a thousand cases by vaginal and abdominal Cesarean section.

In another paper I have shown the superiority of operative over spontaneous delivery in eclampsia where the statistics were made from cases occurring between 1900 and 1912. For in 290 cases of eclampsia with spontaneous labor between these dates the maternal mortality is 18.96 per cent., while in 1496 cases of eclampsia treated by operative delivery during this same period the maternal mortality is only 14.8 per cent., an advantage of 4 per cent. in favor of operative delivery. However, if we collect the cases occurring before 1900 we find the percentages reversed and the advantage in favor of spontaneous delivery. The explanation for this is very simple. Although perhaps the last department of surgery to profit by the great advances in aseptic technic, obstetric surgery is finally coming into its own. Prior to 1900 the eclamptic patients died after operative delivery, some from the intoxication incident to the eclampsia but many from sepsis due to poor obstetric surgery. In other words, if we are to draw correct conclusions it is absolutely necessary to study the cases by periods and not as a whole. That this is true is at once apparent if the field of inquiry be transferred from obstetrics to another class of surgery. If one were to start out to ascertain the operative results of any of the common major gynecologic operations, such as ovariectomy or hysterectomy for fibroids, he would never waste his time in collecting cases operated upon in the early days before aseptic surgery was commonly practised. A 20 or 30 per cent. mortality in the old days for the operations referred to would have been considered fine work. Now a mortality higher than 3 per cent. needs some explanation.

Abdominal Cesarean section performed for any of its indications must be studied by the same method of grouping the cases according to the period in which they were performed, if the conclusions are

to be in any degree correct. The need for such grouping is very well shown in Routh's tables of 1282 cases of Cesarean section in the United Kingdom. Only those cases were collected which had been performed by obstetricians and gynecologists of the United Kingdom who were living June 1, 1910. For example, for contracted pelvis before 1891 there were 26 abdominal Cesarean sections performed with a maternal mortality of 30.7 per cent.; between 1891 and 1900, 127 cases with a mortality of 16.5 per cent.; between 1901 and 1910, 905 cases with a maternal mortality of 8.1 per cent.; from 1906 to 1910 (uncompleted five years) there were 602 cases with a mortality of 6.1 per cent. The last percentage may be taken as the present mortality for abdominal Cesarean section and its modifications in Great Britain in cases of contracted pelvis. But if the total number of cases be taken the maternal mortality in this complication is 9.7 per cent. or 3.5 per cent. higher. Also it can be readily seen that the total mortality would be much higher if there were more cases during the earlier period when the mortality percentage was much higher.

Even Routh himself, in discussing abdominal Cesarean section for eclampsia, makes the same error he is careful to avoid in compiling his own statistics by the group method. Speaking of abdominal Cesarean section for eclampsia, he quotes Kettlitz as having collected twenty-eight cases with fourteen deaths; Hillman, forty cases with twenty-one deaths and so on. Thus in all he states that 105 cases of eclampsia were treated by abdominal Cesarean section with a mortality of 47.6 per cent. May I ask of what value are such figures if the operations were performed without the proper aseptic precautions or if under obstetric conditions which made sepsis almost inevitable? Moran collected 116 cases of abdominal Cesarean section from the literature with a maternal mortality of 48.9 per cent. He tries to rectify this unquestionably excessive mortality by grouping fifty-three cases occurring from 1901 to 1911 with a maternal mortality of 32.32 per cent. But he failed to realize what I have already pointed out, that obstetric surgery and especially abdominal Cesarean section has not advanced as rapidly as have other departments of surgery. Only within the past five years has it begun to dawn upon the mind of the obstetric surgeon in general that he cannot remove the child by the suprapubic route without a high maternal mortality from sepsis, if attempts have been made to deliver from below or even if many vaginal examinations have been made. My own statistics will show conclusively the truth of this statement.

J. T. Williams of Boston in 1913 collected eighty-five cases of abdominal Cesarean section for eclampsia. Since he begins with the

case of van den Akker performed in 1875, naturally the maternal mortality is very high, 48.2 per cent. Yet he proceeds to draw his conclusions as to the value of the operation from a mortality obtained in such a manner. He would restrict the operation to cases of eclampsia in which there is a pelvic contraction sufficient in itself to demand the operation. At least he should have had some sympathy for the obstetric surgeon obliged to perform an abdominal Cesarean section upon an eclamptic with a contracted pelvis with a maternal mortality of 48.2 per cent. staring him in the face.

Fortunately, however, such statistics are incorrect, so far as the present status of abdominal Cesarean section for eclampsia is concerned. For I find that of the 500 cases in my series in those performed from 1908 to 1913 there were 283 cases of antepartum eclampsia where the uterus was emptied by abdominal Cesarean section with seventy-one deaths or a maternal mortality of 25.79 per cent. Up to 1908 there were 198 cases with ninety-five deaths or a maternal mortality of 47.97 per cent. These figures, as will be seen, are approximately the same as those given by Routh, Moran and Williams, 47.6, 48.9 and 48.2 respectively.

Twenty-five per cent. is a surprisingly low mortality for an operation which has been almost uniformly condemned by obstetricians in the treatment of eclampsia except when obstetric conditions, such as contracted pelvis or pelvic tumors, demand the operation irrespective of the eclampsia. While such figures do not mean that every woman with antepartum eclampsia should be subjected to abdominal Cesarean section, they do mean that we will be obliged to revise our opinions regarding the status of the operation when it is indicated. Antepartum eclampsia under the most favorable conditions and under the most approved treatment must of necessity be attended by a high maternal mortality. It is rather difficult to say what is the average maternal mortality in hospital and private practice in this and other countries. Combining the cases already referred to as having been published in another article, prior to 1900 in 2569 cases of antepartum eclampsia there were 669 deaths or a mortality of 26 per cent. From 1890 to 1912 in 1786 cases of operative and spontaneous delivery there were 279 deaths or a maternal mortality of 15.6 per cent. De Lee thinks the mortality of eclampsia is over 20 per cent. Williams states that the mortality varies from 20 to 25 per cent. Hirst estimates the mortality in private practice to be 30 per cent. In the Maternity of the University of Pennsylvania the mortality in 128 cases was 33 per cent. However, the latter author claims that by excluding the cases admitted in such

bad condition that death ensued in less than twelve hours the mortality was less than 13 per cent. The mortality in my own series of 530 cases of eclampsia treated by vaginal Cesarean section was 23.4 per cent.

From these figures it would seem to me fair to conclude that the mortality of the antepartum variety of eclampsia varies from 15 to 30 per cent. dependant upon the number of cases in the series from which the mortality figures are derived, upon the time during which the series of cases occurred and upon other factors which must be taken into consideration in scrutinizing any series of statistics.

I must make it plain that 25.79 per cent. is the actual maternal death rate and that it was not reduced through the exclusion of moribund cases. Since abdominal Cesarean section is the operation of choice in moribund cases when the attempt is made to save the life of the child, it is obvious that quite a number of the operations were performed upon moribund patients. But statistics based upon such exclusions would be unsatisfactory and open to criticism. Certainly the length of time elapsing between the operation and the death of the patient is no good criterion as to whether the patient was in a moribund condition or not. What would be considered moribund by one operator would be called otherwise by another. For this and other obvious reasons, then, it was deemed best to let the mortality figures stand as they were.

While, as has been stated, 25 per cent. maternal mortality in 283 cases is much less than we have been accustomed to think of in connection with the operation of abdominal Cesarean section for eclampsia, nevertheless it is by no means satisfactory when compared with other methods of treating this complication. If the mortality were left at these figures without further explanation, the operation would have to be reserved for cases of eclampsia, such as contracted pelvis, where the obstetric conditions demand delivery by the suprapubic route as the only way of saving the life of the mother, not taking into consideration the life and safety of the fetus. Such cases, however, are very few in number. While in 25 out of the 283, contracted pelvis was given as an indication for the section in addition to the eclampsia, undoubtedly many of these were borderline cases where delivery could have been accomplished by some other method, possibly at a sacrifice of the child, but at least without running the risks incident to opening the peritoneal cavity in any obstetric operation. Tumors of the uterus or of the pelvis, atresic conditions of the soft parts or other conditions making delivery by the natural passages impossible or extremely hazardous

are comparatively rare and would not often be found in conjunction with eclampsia. To be sure the operator would have the satisfaction of knowing when confronted with absolute indications for abdominal Cesarean section in an eclamptic, that the mortality for such a procedure has been shown to be only 25 per cent. But only rarely would this be satisfactory for only occasionally would he meet with such a case. So markedly has the mortality been reduced in the last five years that the indications for the operation are bound to be widened. It will prove far more profitable to point out the means by which the mortality can be still further reduced, than to endeavor to limit the operation to those cases of antepartum eclampsia with absolute obstetric indications for the operation.

Returning once more to Routh's statistics, it is seen that the present mortality for Cesarean section in the United Kingdom is 6.1 per cent. However, in another table Routh shows that in 469 favorable cases, that is, where the sections were performed upon women not in labor, whose membranes were unruptured, the mortality was only 2.9 per cent. In other words, the mortality was 3.2 per cent. lower than in contracted pelvis in general. Again, where the sections were made upon women in labor with ruptured membranes or where frequent examinations or attempts at delivery had been made, the mortality was 17.3 per cent. in 230 cases of contracted pelvis or 11.2 per cent. higher than the mortality in the 602 cases. We see at once not only that the operation of abdominal Cesarean section above all others, is markedly affected by previous manipulations from below but how a fuller realization of this fact by operators may still further reduce the maternal mortality. If Routh's figures be correct, 11.2 per cent. of the mothers died needlessly, since such manipulations from below should have contraindicated the suprapubic operation. I am not prepared to state in how many of the 283 cases occurring between 1908 and 1913, attempts at delivery and frequent examinations preceded the section, for in many cases the questions were left unanswered. However, in 28 cases where attempts were made to deliver from below prior to the section the mortality was 35.71 per cent., 10 per cent. higher than the total mortality in the 283 cases. Vaginal examinations were made in 180 of the 283 cases with an increase in the maternal mortality from 25.79 to 28.33 per cent.

Contracted pelvis and eclampsia are two entirely different obstetric complications, so far as the necessity for vaginal examinations is concerned. In the former complication the patient usually has been seen prior to labor and a plan of procedure decided upon.

Eclampsia is a more sudden complication and in the large majority of cases a careful examination of the pelvis per vaginam is a necessity before determining upon how the woman is to be delivered. But a careful examination under aseptic precautions followed by a section is an entirely different matter, so far as freedom from sepsis is concerned, than where frequent vaginal examinations and attempts at delivery have been made. While more or less conjectural, I am inclined to the belief that the mortality of antepartum eclampsia treated by abdominal Cesarean section can be reduced to 20 per cent. if careless or frequent vaginal examinations and prior attempts at delivery from below be eliminated. At any rate the reduction would be considerable and should be striven for with every means at our command.

I wish to emphasize the fact that in every instance in the 500 cases in the series under consideration the patient had had at least one distinct eclamptic convulsion. Unless convulsions be taken as criteria as to whether or not the cases should be included in the series, many cases of Cesarean section for threatened eclampsia would have to be included. "Threatened" is such an indefinite word and therefore subject to such varied interpretations, that it was thought advisable to exclude such cases. Had they been included, and quite a few of them can be collected from the literature and were sent to me among the other cases, the mortality of the series would undoubtedly have been greatly decreased for reasons I shall show later.

Another important fact that must be kept in mind is that the 500 cases represent the work of not a few but of over a hundred operators. I asked prominent obstetricians, gynecologists and surgeons the world over not only for any cases they may have had, but for information regarding cases they may have heard of. The fact that an operator had only a single case may or may not have had an important bearing upon his result. It is perfectly possible for him to have had a large experience in Cesarean section for other indications. However, it is interesting to note that combining the largest series received from five operators, forty-two cases in all, the maternal mortality was only 9.5 per cent. This is an exceptionally low mortality for antepartum eclampsia under any form of treatment. Possibly it cannot be duplicated. I do not know as to that but I do know that these figures are correct and that it shows what can be done by skilled operators in antepartum eclampsia with an operation that until very recently has been scorned by most obstetricians.

A much larger number of cases shows a decrease in the maternal mortality, although not anywhere near 9.5 per cent., which, as has been before remarked, is exceptional. Grouping the operators who have performed five or more abdominal Cesarean sections for eclampsia before or after 1908 it is seen that twenty operators had 52 cases prior to 1908 with a maternal mortality of 46.15 per cent. From 1908 to 1913 these twenty operators had 120 cases with a mortality of only 21.66 per cent. Thus experience and good judgment probably is accountable for the lowering of the total mortality in the 1908 to 1913 period about 4 per cent. However, too much stress should not be laid upon this reduction in mortality on account of experience. As I have repeatedly contended elsewhere, no method of treating eclampsia is of any practical importance if it cannot be carried out at the place where the woman is stricken with eclampsia. While hospitals supply the great mass of statistics, by far the larger number of antepartum eclamptics never see the inside of a hospital. The time has now arrived when it must be seriously considered whether the obstetric consultant for a county or district should not be prepared to perform major obstetric operations, like Cesarean section, in private houses. A great deal of such operating is being done now with excellent results. It means more trouble and painstaking attention to detail on the part of operator and assistants, but this surely is not an insurmountable difficulty. The major obstetric work of each locality would tend to gravitate into the hands of trained and skilled obstetric surgeons. Then would we see the disappearance of single cases of certain major operations and be witness to the improvement in results due to the skill acquired from experience with many cases.

In previous papers I have insisted upon early evacuation of the uterus, if good results are to be obtained in the treatment of antepartum eclampsia. While the total maternal mortality for the 530 cases of eclampsia treated by vaginal Cesarean section was 23.4 per cent., the mortality was only 18.5 per cent. when delivery was accomplished after from one to five convulsions. Perhaps the most striking illustration is that of Olin, who from the nature of his statistics was able to estimate accurately the time elapsing between the first convulsion and the operative delivery of his patient. He found the mortality in 31 cases delivered one to three hours after the onset of the first convulsion to be only 3 per cent. On the other hand, in fifty cases delivered from six to twenty-four hours after the first convulsion the mortality was 28 per cent.

The same lowering of the total mortality in patients operated

upon from 1908 to 1913 where abdominal Cesarean sections were performed early is shown in the present series. In thirty cases operated upon immediately after the first convulsion the mortality was only 16.6 per cent. In 124 cases where the operations were performed after from one to five convulsions the mortality was only 20.1 per cent. Thus the mortality was reduced 5.69 per cent. by operating early instead of late, if we consider the larger series of cases or 9 per cent., if the smaller series be considered where the operations were performed after a single convulsion. On the other hand, in eighty-nine cases where the operations were delayed until after from six to thirty convulsions the mortality rose to 30.3 per cent. or practically 5 per cent. higher than the total mortality.

I have always contended that the operative treatment of antepartum eclampsia has never been given a fair trial by the great mass of practitioners and specialists. As has been conclusively shown above, good results can never be obtained under any operative method of treatment, so long as emptying of the uterus be delayed until the mother is so profoundly intoxicated as to prevent recovery, even if the elaboration of the eclamptic toxins be put a stop to. When it is clearly understood that delay is dangerous and that the uterus must be emptied by the method best adapted to the case at hand, then and then only will marked improvement be seen in the mortality of antepartum eclampsia. And just so long as we compromise by treating the patient medicinally after she has had a convulsive seizure and is still undelivered, only emptying the uterus as a last resort, just so long will the mortality be high. I have very little sympathy for a doctrine which would not be considered a moment if it were not obstetrics we were dealing with. Who to-day advocates that appendicitis be treated medicinally until the patient is in a dangerous condition from sepsis? What would be thought of him who based his opinions of what can be done surgically for such patients upon what is accomplished by late operations? Yet is that not exactly what is being done to-day by the advocates of the conservative, medicinal treatment of antepartum eclampsia? Try elimination first after the patient has had a convulsive seizure, try hot packs, sweating, active catharsis, veratrum viride, try everything and anything while the eclamptic toxins are still being elaborated within the maternal organism, and when the patient is becoming worse, when she is about to die, empty the uterus. When one protests against such irrational treatment and proves conclusively that under early operative treatment the mortality is greatly lessened,

the reply is that many unnecessary operations have been performed, that the patients would have recovered if treated less radically. The trouble has not been in excessive radicalism. We have not been radical enough in the presence of this most dangerous of obstetric complications, if by being radical is meant the immediate putting out of commission the factory where the poisons are being elaborated. Failure of the operative treatment of eclampsia is due to delay, to unskillful work from below or to avoidable sepsis when the work is done from above.

There is still another factor in the treatment of antepartum eclampsia which must not be overlooked. Time was when the fetus was considered a negligible factor in the discussion of any obstetric problem. That day has passed or is rapidly passing. Now one is placed on the defensive when any obstetric treatment entails a high fetal mortality. While, if it comes to a choice between the life of the mother and that of her unborn child, preference is usually given the mother, the advances in obstetric surgery have made it obligatory upon the operator to save more fetal lives without much more danger to the mothers.

I have called attention in my study of vaginal Cesarean section for eclampsia to the difficulty of arriving at any correct conclusions as to the fetal mortality on account of the inexactness of the data referring to the child. Just as in that series, so in the present series, certain exclusions had to be made, if one were to gain any information as to the value of the operation in saving fetal life. The same rules were followed as in the vaginal Cesarean section series.

1. All children weighing less than 2000 grams up to the eighth month were judged to be premature and were not counted whether they lived or died.

2. No child was included who was known to be dead at the time of the operation.

3. If a child lived an hour or more after delivery it was counted as living; if less than an hour it was included among the deaths.

Naturally, the fetal mortality in abdominal Cesarean section for eclampsia is very low since the child escapes the traumatisms incident to forcible delivery through the natural passages. The fetal mortality after vaginal Cesarean section was 21.2 per cent. This mortality was found to be lower than that after spontaneous labor and after operative deliveries of various kinds other than vaginal Cesarean. In the present series, up to 1908 there were 123 children who could be counted, with seventeen deaths or a fetal mortality of 13 per cent. From 1908 to 1913 there were 235 children with only

eight deaths or a fetal mortality of 3.4 per cent. Even this strikingly low fetal mortality is reduced if the children who were delivered after one to five convulsions be considered. From 1908 to 1913 there were 118 such children with only three deaths or a fetal mortality of 2.5 per cent., practically 1 per cent. lower on account of the fact that the children were not so poisoned when delivered.

In very severe or neglected cases of antepartum eclampsia where abdominal Cesarean section is not performed until after a number of convulsions, the fetal mortality is much higher. In forty-nine cases prior to 1908 operated on after from six to fifty convulsions, thirteen children died giving a fetal mortality of 26.57 per cent. From 1908 to 1913 in seventy-six cases, six children died, with a resulting fetal mortality of 7.8 per cent. Thus under the same operative conditions, whereby the children escaped the dangers of forcible extraction through the natural passages, the fetal mortalities were just twice as great when delivery was delayed until the fetus was affected by the eclamptic poison. So again is seen the necessity of early emptying of the uterus, if the rights of the viable fetus are to be safeguarded.

And now what has been learned from this mass of statistical data concerning the results of abdominal Cesarean section in eclampsia? In other words, because of these facts are we in a better position to determine the status of abdominal Cesarean section in eclampsia? I may be prejudiced, but it seems to me the last query may be answered in the affirmative.

First of all, the operative results during the past five years have so improved as to force us to change our opinion as to its right of a place among other obstetric operations employed in the treatment of antepartum eclampsia. An operation with a 48 per cent. mortality might be employed in emergencies when nothing else could be substituted, but it would have no place as an elective operation, when far better results could be obtained in other ways. But, as has been shown, during the past five years the maternal mortality has been reduced nearly one-half. Any procedure giving a 25 per cent. mortality in the treatment of eclampsia has at least a right to be considered. Now, please do not misunderstand my position. I am not advocating that every pregnant woman with eclamptic convulsions be subjected to abdominal Cesarean section. This may seem an unnecessary statement but from past experience I am quite sure that such will be charged against me as a result of this paper. I merely state that hereafter no one will have any right, scientifically, to condemn the operation without a hearing. He may favor other

methods of treating antepartum eclampsia. He has that right, because other methods from a statistical standpoint are superior to abdominal Cesarean section in the treatment of eclampsia. But with the results of the operation improving so rapidly, it must at least be considered seriously, which has never been done up to the present time except under conditions where the section was absolutely demanded.

There will be little or no discussion as to abdominal Cesarean section being indicated in cases of contracted pelvis with eclampsia as a complication. Even the opponents of the operative treatment of eclampsia will concede that the test of labor, while indicated in borderline cases of contracted pelvis has no place in eclampsia. Medicinal treatment with the hope that the uterus will be emptied spontaneously, presupposes that the labor will be fairly short and easy, not prolonged and difficult, as is usually the case in borderline cases of contracted pelvis.

Abdominal Cesarean section is distinctly contraindicated in eclampsia when attempts at delivery have been made from below or when it be suspected that many vaginal examinations have been made without aseptic precautions. Under these conditions manual dilatation or vaginal Cesarean section are preferable procedures. Far better results would follow perforation of the child and extraction, if there be a contracted pelvis and the woman septic, than extraction from above through an abdominal incision.

Tumors of the uterus or of the appendages may demand Cesarean section in the eclamptic as well as in the normal woman at full term or thereabouts. Whether the delivery is to be made from below or above will depend upon the nature, size and location of the tumor, irrespective of the eclampsia, except that it must be borne in mind that no protracted operation is allowable upon the eclamptic, if it can possibly be avoided.

Abdominal Cesarean may be preferable to vaginal Cesarean section in antepartum eclampsia, when the cervix is rigid and undilatable and cannot be drawn down into view. The same may be true in certain cases of small or rigid vagina or partial atresia of the soft parts. Again in case of rigid os and large fetus, delivery by the suprapubic route may offer a far better chance for both mother and child: for the mother, because the delivery will be accomplished quickly, for the child, because it will be saved the trauma of being forcibly dragged through a relatively small birth canal.

Very rarely will abdominal Cesarean section be indicated prior to the eighth month of pregnancy. In these earlier months vaginal

Cesarean section is the operation of choice since it is just as quickly performed and there is less risk of sepsis.

The choice of operation will depend upon the nature of the case, the surroundings of the patient and the skill and previous training of the attendant. Without previous obstetric or surgical training, so far as the patient and her child are concerned, it would be far better not to attempt delivery but to treat the eclamptic medicinally and wait for spontaneous delivery no matter how long that may be delayed. In other words, the antepartum eclamptic can be killed by a bungler as, if not more, easily than can the noneclamptic woman. If the os is easily dilatable, probably in the vast majority of instances, it would be better for the practitioner to proceed to dilate and deliver under aseptic precautions than to make use of any cutting operation. With rigid os the choice will be between vaginal and abdominal Cesarean section subject to the indications and contraindications just submitted. Let the obstetrician or surgeon decide for himself between these two, bearing in mind always that the abdominal route is far more dangerous to the mother under certain conditions than is any operation where the peritoneal cavity is not opened. In making his choice, let him not forget that the eclamptic who is delivered the most promptly after the first convulsive seizure, in the minimum time and with the least possible trauma will stand the best show of recovery.

THE SERUM DIAGNOSIS OF PREGNANCY BY THE DIALYSATION METHOD.*

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THE Abderhalden reaction is based upon simple chemical principles. When food is taken into the gastrointestinal canal, it can be absorbed only after certain chemical changes have taken place, most of which are the result of ferment action. Abderhalden found that if simple organic substances, foreign to the blood, were introduced directly into the circulation, instead of reaching it indirectly through the intestinal tract, new and hitherto nonexistent ferments appeared in the blood and digested these foreign substances. For example, when cane sugar is injected directly into the circulation, a ferment which was not previously in the blood, is liberated and digests the

* Read at a meeting of the New York Obstetrical Society, January, 13, 1914.

sugar into simpler substances, preparatory to its assimilation or excretion. Abderhalden detected this ferment by the following means: he placed the blood serum of a dog, previously injected intravenously with cane sugar, into a polariscope tube, together with a definite solution of cane sugar; he then subjected the tube to incubation temperature and took readings before and after incubation. By this method he was able to detect that the quantity of sugar, which he had placed in the tube, diminished, *i.e.*, a part of it was digested into simpler substances by the serum. The blood serum of a dog not previously injected with sugar, when treated in the same way, left the sugar in the tube unaffected.

The same investigator found that more complicated organic substances foreign to the blood, such as proteins, when injected directly into the circulation, were similarly digested by newly formed ferments. This was true whether the protein used came originally from a different or similar animal species.

The premises which suggested the pregnancy test are the following:

1. Schmorl, Veit, and Weichardt have demonstrated that during pregnancy, microscopic parts of placenta, and in some pathological instances even macroscopic particles, are carried into the maternal blood stream. Peters and others showed that chorionic villi are present in the first month of pregnancy.

2. Abderhalden showed that proteins, even when they originated from the same species, when injected into the circulation, were digested by newly formed ferments. In the pregnant woman the particles of placenta act exactly like the sugar experimentally introduced into the circulation of the dog, defensive ferments are formed by the blood which digest the placental albumen. Abderhalden holds, however, that these defensive ferments in the serum of pregnant women are not due entirely to parts of villi thrown into the circulation, but in part to a more general exchange of substances between the placental and maternal blood.

It must not be forgotten that this same principle should be and has been applied to the detection of many other normal and pathological processes, which involve the presence of some substance alien to the blood; as in cancer, tuberculosis, nervous diseases, etc.

To recapitulate: the blood of a pregnant woman contains a certain ferment specifically able to digest placental albumen. This ferment appears as early as six weeks after the last menstruation and continues to be present up to fifteen days or so after the expulsion of the placenta. On the other hand the serum of nonpregnant indi-

viduals does not contain this ferment and hence cannot digest placental albumen.

Ferments may be detected by the optic method with the aid of the polariscope; this requires expensive apparatus and has other drawbacks. Abderhalden therefore devised the simpler, the dialysation method, which depends upon the following physical reaction: The complex albumen molecule, when placed into a dialysing thimble made of porous parchment paper, cannot pass through its walls, while the products of albumen digestion, of which the peptones and amino-acids are the main representatives, are able to penetrate the membrane and consequently appear on the outside of the dialyser, where their presence can be detected by simple chemical tests.

The essential substances necessary for the dialysation method:

1. Pure coagulated placental albumen.
2. Fresh nonhemolyzed serum which contains no red cells.
3. Ninhydrin, a chemical compound which gives a purple color when heated together with albumen or with the products of albumen digestion.
4. Perfect dialysers. As the starting substances in the test, placenta and serum, are composed of albumen, and the sole object of the test is to detect the products of albumen digestion, it becomes necessary to separate the two, as ninhydrin reacts to both of them. We therefore require a dialyser, which if perfect, acts as an impermeable barrier to the placental and serum albumen placed within it, while it allows peptones and amino-acids, the products of albumen digestion, to pass through its walls.
5. Glassware, incubator, etc., articles usually found in a well-equipped laboratory.

The following is an outline of the mode of procedure:

Pure placental albumen, the serum to be tested, and toluol, an antiseptic, are placed within a dialyser in definite quantities. The dialyser is then suspended in a small flask containing 20 c.c. of sterile distilled water covered with toluol. The stoppered flask is placed in an incubator for sixteen hours at blood temperature. At the end of this period the dialyser is removed and the water remaining in the flask is tested for the digestive products of albumen, the peptones and amino-acids. If a ferment reaction took place, these substances must have diffused through the dialyser into the water. A definite quantity of ninhydrin is added to 10 c.c. of the water and the mixture is boiled exactly one minute. If amino-acids and peptones were present, in other words if placental ferment was present in the serum, the water turns purple. To prove that it was a ferment

that digested the placental albumen into amino-acids and peptone and that these substances were not previously in the serum or the placental albumen, it becomes necessary in each case to make the following control: Into another dialyser we place the same amount of placental albumen, toluol, and serum, with this difference, that any ferment which the serum might have contained was previously destroyed by heating, *i.e.*, the serum was inactivated. In addition to this control, it is customary to run parallel tests with definitely known pregnant and nonpregnant sera.

Although the basic principle and a bare outline of this test give the impression of being very simple, as a matter of fact the execution of the dialysation method is extremely difficult. The difficulties met with depend, in part, upon the proper preparation of the essential materials needed, especially in obtaining pure placental albumen, of nonhemolytic serum, and of proper dialysers. Further on will appear all the details of preparation; the latter are accompanied by innumerable difficulties of which we shall just mention a few here. The placenta must be washed free of all blood, which takes from one to three hours and this must be begun as soon as it is expressed. Placental tissue is not pure albumen, it also contains some peptone and amino-acids. If one remembers that the test depends upon the power of the serum to digest placental albumen into peptone and amino-acids, it is essential to start out with placental albumen containing none of these substances, or else we should get a positive reaction even without ferment. To rid the placenta of peptones and amino-acids, it is repeatedly boiled until the water no longer contains any of these substances. Even when a pure placental albumen has been obtained, it at times deteriorates on keeping; to make sure of good albumen, we must therefore retest every time before using it for a test. Regarding the dialysers, no matter what the maker guarantees, each must be tested as to its permeability to peptone and amino-acids, and its impermeability to albumen. More than one-half of them are found unfit for use. Moreover, usage spoils them, hence they must be retested every two to three weeks. Regarding the serum, we have stated that the placenta to start with, should contain no amino-acids, the same holds true for the serum. In the latter, amino-acids are absent if it is obtained after fasting. The serum must not be hemolyzed, since broken up red cells free ferment, nor must it contain red cells, since these are later broken up at incubator temperature. The required amount of ninhydrin must be exactly weighed out, all glassware must be dry and sterile, the incubator must not run too high, or all results will

be positive. The distilled water must be sterile. Throughout, operating-room asepsis and chemical cleanliness must be maintained, the work must be done with sterile forceps, the hands must not touch any of the materials used, as perspiration contains amino-acids, etc.

This short review of the precautions and the possible sources of error will show how very difficult it is to carry out the test. Even if every source of mistake has been avoided up to the time the flasks are removed from the incubator, new and vital errors may creep in, when testing for amino-acids by means of ninhydrin. Unless after the prescribed one minute boiling, the quantities of fluid remaining in the test and controls are exactly equal, the test may lead to a wrong interpretation. The point we are trying to make, is, that a solution boiled down to 8 c.c. may give a negative ninhydrin reaction, while if the same solution is concentrated down to 7 c.c. it may give a positive reaction. The amount of evaporation after one minute's boiling, no matter how carefully we boil, may not always be the same. To make our results reliable the control must be evaporated down to the same amount as the test itself and as we cannot be certain that this is always so after one minute's boiling, it is necessary to measure the fluid remaining after one minute's boiling and if it is not the same in test and controls, the serum in question must be tested again.

In the *Bulletin of the Lying-In Hospital* of June, 1913, the writers published in detail the results of the examination of 563 sera from different individuals, 370 were known pregnant and 193 were known nonpregnant sera. In the beginning we did not carry out the technic properly, as we afterward learned; with each improvement we started a new series, there were eight in all. In the first series the known pregnant sera all gave the desired reaction, while 68 per cent. of the known nonpregnant sera gave wrong results. In the last series 5.5 per cent. of eighty-nine known pregnant, and 8 per cent. of forty-nine known nonpregnants gave wrong results. Since the publication of that article we have further improved the technic but still have not obtained uniform results. An additional 120 known pregnant sera were examined with 4 per cent. failures, and an additional seventy-three known nonpregnants, with 8 per cent. failures.

CONCLUSIONS.

1. We do not deny in the least that Abderhalden's "defensive ferment theory," is correct, but we must admit that the dialysation

method has not proved infallible at our hands. Of late we have always been getting correct results with the pregnant sera, but have not been so fortunate with the nonpregnant ones. The controls with inactivated serum have invariably been negative since the publication of our last article. We feel that our incorrect results may be due to errors in technic, up to date however we have not been able to ascertain what these are although we followed Abderhalden implicitly. Pearce and Williams in Philadelphia, and Strong at the Woman's Hospital in New York, have also not been entirely successful. On the other hand many German investigators use the dialysation method for diagnostic purposes. Their published results have been better than ours. In this country Schwarz of St. Louis, has done much good work and firmly believes that the dialysation method is absolutely reliable.

2. Since we ourselves cannot guarantee uniform results, we cannot conscientiously recommend the method for diagnostic purposes. Many of those who do put it to this use, when they obtain a positive reaction in a case which eventually proves to be nonpregnant, content themselves by saying that the placental albumen must have been impure or blame it upon some other error in technic. Since the error was not detected, until the further course of the case made it evident, the method must be considered useless and therefore cannot be recommended for diagnostic purposes, until the technic has been improved to such a degree that errors can positively be avoided.

3. Much of the literature commending the dialysation method is not convincing, because the writers have reported the results of only a few nonpregnant cases. Articles which tell us nothing about controls are of no value. Unless the article tells us that the results were obtained by having followed the Abderhalden technic in every detail, without modifications, they cannot be considered reliable. Articles which make fantastic claims for the method, are not to be considered seriously, for instance the claim that it is possible to tell, with this test, whether a woman has had intercourse; spermatozoon being then used instead of placental albumen.

4. The claim that the serum of eclamptic patients contains less ferment than that of normal pregnant women, and therefore gives a weaker Abderhalden reaction is doubtful, for the difference is based entirely upon the intensity of the color. When we consider that three seconds more of boiling in a normal case, will produce a deeper color, the fallacy of such deductions in eclampsia becomes apparent, and moreover we did not find such weaker reactions with the serum of eclamptics.

5. The dialysation method is entirely a laboratory procedure, the many sources of error make it absolutely unsuited for an office test, although the little box, containing the reagents, etc., put up by a well-known drug firm, would lead one to believe that it is. The box contains two dialysers, powdered placental albumen, etc. The powdered albumen is absolutely useless, as we have convinced ourselves by personal trial. Many chemists have vainly tried to manufacture a pure and stable placental albumen. It seems a pity that such an outfit should be put on the market, for it will make many believe that the test is easy. If the outfit is generally used the literature will soon be crowded with positive and negative results equally devoid of value.

THE TECHNIC OF THE ABDERHALDEN TEST IN DETAIL.

Preparation and Preservation of Pure Coagulated Placental Albumen.

—Coagulated placental albumen to be pure, must be absolutely free of blood and all substances capable of being diffused through a dialysing membrane and giving a reaction with ninhydrin; hereafter we shall refer to these substances as “dialysable substances.” With reference to this test, these dialysable substances are the digestive products of placental albumen, *i. e.*, peptone and amino-acids.

Material Needed.

Fresh placenta of a healthy mother.

Two dry sterile white-enameled basins, capacity 4 quarts each, for washing placenta.

One pair of sterile scissors.

One dry sterile 1-liter glass graduate.

Two dry sterile 200-c.c. glass graduates.

Five gallons of 0.9 per cent. sterile salt solution.

Five gallons of sterile freshly distilled water.

One sterile pestle and mortar.

Three 800-c.c. dry sterile glass beakers, for boiling and washing blood-free placenta.

Four sterile forceps.

Glacial acetic acid C.P.

Two narrow-mouthed dry sterile 250-c.c. glass beakers.

Hard filter-paper. (C. S. & S. No. 575.)

Six sterile dry test-tubes (7 inches by 3/4 inch). For description see below.

Six dry sterile 5-c.c. pipets.

One 1-c.c. dry sterile standardized pipet, for ninhydrin.

Bunsen burner, tripod, asbestos mat.

Five sterile, dry, glass-stoppered bottles, for storing finished albumen.

Chloroform.

Toluol C.P., 1 pint.

One pair sterile rubber gloves.

Six dry sterile glass funnels.

Ten cubic centimeters of a 1 per cent. solution of ninhydrin.

Test-tube holder.

Clock with second hand.

Sterile glass "Siedenstaebchen" or glass beads.

Six ordinary test-tubes.

(a) To free placenta of blood: Placental albumen, though perfect in other respects, when mixed with blood, is apt to give faulty results with nonpregnant sera when these are tested for the presence of ferment. In a previous article (*Bulletin of the Lying-In Hospital*, June, 1913) the writers showed that results differed, depending upon whether macroscopically blood-free placenta or placenta containing a small amount of blood was used. The placenta is freed from blood as follows: As soon as a healthy child is born of a healthy mother, the cord is cut with a sterile scissors and permitted to bleed, in this way some blood is removed from the placenta. When the cord has stopped bleeding, a matter of from one to two minutes, the placenta is expressed into a sterile white-enameled basin, containing sterile 0.9 per cent. salt solution; all superficial clots, membranes, and cord are removed. The more quickly this is done, the less clotting will occur in the small placental vessels and the easier it will be to wash the placenta free of blood later. The placenta is now cut with sterile scissors into pieces the size of a twenty-five-cent piece. The latter are then placed into another sterile white-enameled basin with a capacity of 4 quarts, containing 0.9 per cent. sterile salt solution, the pieces are stirred around with the hands covered with sterile rubber gloves and gently squeezed, while the salt solution is frequently replenished, at first every minute, later every five minutes. At the end of from one to three hours, nearly all the tissue will be snow white, small pink pieces are cut away with sterile scissors, then the snow-white pieces are washed for five minutes in sterile freshly distilled water to get rid of the salt. From 10 to 20 grams are obtained from one placenta. (The writers found that this method was more satisfactory than forcing tap water through an umbilical

vein before cutting up the placenta, as this often causes the placenta to look dirty.) When white, the placental pieces are mashed up in a sterile mortar to get rid of more blood, should any be present, and the tissue is placed with sterile forceps into a sterile 1-liter glass graduate and washed with sterile distilled water, which is then poured off. The placental albumen must appear white in this glass graduate, gray or pink pieces are discarded, since they contain blood. The whole process is preferably carried on without a stop.

(b) To rid the blood-free tissue of dialysable substances and to cause coagulation of the placental albumen: Into an 800-c.c. sterile glass beaker are placed 100 times (by volume) as much sterile distilled water as there is tissue in the liter measuring glass, and five drops of glacial acetic acid per liter of water, are added. This is brought to a boil, when the tissue from the liter glass graduate is placed into the boiling water with sterile forceps. Boiling is continued for ten minutes, then the water is poured off and sterile distilled water (amount immaterial) is poured into the beaker, the placental tissue is now stirred and shaken in this, *i.e.*, it is washed for five minutes, the water being replenished a few times. Meanwhile some more freshly distilled water is boiled in another sterile 800-c.c. beaker and the washed placental tissue is placed into it with a sterile forceps, and boiled again for ten minutes. Again 100 times as much water as tissue is used, but this time no acetic acid is added. The water is poured off and the tissue again washed as before for five minutes. This process of boiling the placental tissue in 100 times its volume of sterile freshly distilled water in a sterile glass beaker, pouring off the water, and washing in sterile distilled water for five minutes, is repeated six times without stopping, all except the first water contains acetic acid. Only two beakers are used for this, they being rinsed with sterile distilled water each time after they were used for boiling and washing. In less than six washings and boilings we can hardly expect to get rid of all dialysable substances and often this is not enough. It is a waste of time to test for dialysable substances before six such boilings and washings.

(c) To test for the absence of dialysable substances: The coagulated placental albumen is removed with sterile forceps from the beaker it was last boiled and washed in, and placed into a dry sterile 200-c.c. graduate. Into a 250-c.c. glass sterile beaker, are placed five times (by volume) as much distilled water as there is tissue in the graduate. This is brought to a boil, and then the tissue in the graduate is placed with sterile forceps into the boiling water. Boiling is continued for five minutes. (The 250-c.c. beaker must be

small mouthed or else the water will all evaporate in five minutes and the tissue will burn.) A part of this water is then filtered through a hard filter-paper (C. S. & S. No. 575) into an ordinary dry sterile test-tube and 5 c.c. of the filtrate, measured with a dry sterile 5-c.c. pipet, are placed into another dry sterile test-tube (7 by $\frac{3}{4}$ inches.) To the latter 1 c.c. of a 1 per cent. watery solution of ninhydrin is added, this being measured out with a dry, sterile standardized 1-c.c. pipet. The mixture is boiled exactly one minute, the details of the boiling will be mentioned later under "The actual testing of a given serum for ferment." If the solution in the test-tube after boiling remains clear or slightly cloudy at the end of one-half hour, standing, without any tinge of violet color in transmitted day light, the water and consequently the placental albumen contained no dialysable substances. How to read the color will be described later under "The actual testing of a serum for ferment." If there is a tinge of violet the tissue contained dialysable substances, and the placental albumen must be washed again in sterile distilled water (amount immaterial), after which the boiling is repeated in five times the volume of sterile distilled water in another sterile small-mouthed 250-c.c. beaker. After this second boiling, the water is again filtered and tested as before; this washing, boiling, and testing with ninhydrin is repeated until there is no tinge of violet at the end of one-half hour standing. If there is a violet tinge after six such washings and boilings in five times the volume of water, we discard the tissue, for too much boiling, filtering, etc., will cause the loss of too much albumen.

(d) Storing the pure coagulated placental albumen: This must be done with much care or else the tissue will soon contain dialysable substances again, the latter being caused by the digestion of the tissue following infection. The tissue is taken from the water in which it was last boiled, said water having been proven to contain no dialysable substances, and is placed with dry sterile forceps into dry sterile glass-stoppered bottles; about 5 grams being placed into each bottle. Then the bottles are filled with one-third sterile freshly distilled water, one-third chloroform, and one-third chemically pure toluol. The glass stoppers must dip into the fluid contents of the bottles, for any tissue on the wall of the bottle not covered with this fluid may putrify and thus will contaminate the remainder of the albumen in the bottle. The filled bottles are then kept on ice.

The placental albumen will keep indefinitely if prepared and stored properly. In our previous experiments we were able to prepare the tissue properly, but always found that at the end of twenty-four

hours the water it was kept in, again contained dialysable substances. This even happens occasionally now, though rarely, since we have learned to properly store the tissue under aseptic precautions. To guard against mistakes the tissue which was perfect when stored, is tested again each time before using it for a regular test. The required amount for the tests is boiled in five times the volume of sterile freshly distilled water, then filtered, and 5 c.c. of the filtrate is boiled with 1 c.c. of a 1 per cent. watery solution of ninhydrin as before. Sometimes we get a positive reaction, the placental albumen is then washed, boiled, and tested again in the same way, if the reaction is again positive the tissue is discarded. The advantage of keeping the tissue in small bottles instead of in a large jar, is, that if an infection occurs, it may only affect one bottle and thus not all the placental albumen will be spoiled.

Several methods of simplifying the preparation of placental albumen have been advised, but in the writers' hands, they have always been found to be imperfect. The powdered albumen ready for use we have found unreliable, as it is not stable.

Method of Obtaining Perfect Dialysers.—These must come up to the following requirements:

1. They must not permit albumen, placed inside of them, to permeate through their walls.
2. They must permit the products of albumen digestion (peptone and amino-acids), when placed inside of them, not only to pass through their walls, but also to pass through at the same rate, *i.e.*, they must be of equal density.

In a previous paper (*Bulletin of the Lying-In Hospital*, June, 1913) the writers have shown that of the Schleicher and Schuell dialysers, No. 579a, is the best. No matter what the guarantee of the makers, the dialysers must be tested for their impermeability to albumen and their permeability to peptone. More than one-half of them will let albumen through, or will not let peptone through, or will let peptone through too rapidly or too slowly, in other words they are unfit for use. Even when they have been proven satisfactory, dialysers should be tested again every two or three weeks, since boiling has a tendency to make them denser. Before testing them, the parchment thimbles are placed in cold water for from one to two hours to soften them.

Materials Necessary to Test for Impermeability to Albumen.—Schleicher and Schuell No. 579a dialysers.

White-enameled basin, to soften dialysers in.

Five per cent. solution of fresh egg albumen or fresh human nonhemolized blood serum (2 1/2 c.c. per dialyser).

Solution sodium hydrate 33 1/3 per cent. for biuret test.

One to 500 solution of copper sulphate, for biuret test.

One 1 c.c. dry, sterile pipet.

Four liters sterile freshly distilled water.

Two dry sterile 800-c.c. glass beakers, to sterilize dialysers in.

Four sterile dry forceps.

Bunsen burner, tripod, asbestos mat.

Four dry sterile 2 1/2-c.c. pipets.

One dry sterile abdominal clamp, broad enough to grasp a dialyser transversely.

Toluol C. P., 1 pint.

Incubator at 37.5. C. Not to be used for any bacteriological work.

Dry sterile glass containers (one per dialyser). For description see below.

One dry sterile 20-c.c. pipet, to fill container.

One sterile cork or cotton stopper to fit each container.

Dry sterile 10-c.c. pipets. (One for each dialyser tested.)

Dry sterile test-tubes, 7 inches by 3/4 inch. Two for each dialyser to be tested. For description see below.

One dry sterile 1-c.c. standardized pipet, for ninhydrin.

Ten cubic centimeters of a 1 per cent. ninhydrin solution.

One dry sterile glass-stoppered jar, for dialysers.

Chloroform.

Two sterile towels.

One sterile wash bottle.

One dry sterile 3-c.c. pipet, for toluol.

Clock with second hand.

Dry sterile "Siedenstaebchen" or glass beads.

Test-tube holder.

One 10-c.c. graduate, to measure fluid remaining after boiling dialysate with ninhydrin.

Testing for impermeability to albumen: 1. Sterilizing the dialyser. The softened dialysers are placed into a sterile 800-c.c. beaker containing boiling distilled water and left there for one-half a minute. The Bunsen burner is then removed from beneath the beaker and with sterile forceps the dialysers are removed and placed on a sterile towel.

2. Filling the dialysers with albumen: The sterile dialysers are picked up with dry sterile forceps and 2.5 c.c. of a 5 per cent. watery

solution of fresh egg albumen or 2.5 c.c. of fresh human serum (the writers prefer the latter), are placed within them with a dry sterile 2.5-c.c. pipet. Great care must be exercised neither to touch the outside wall, the inside wall, the upper edge of the dialyser or the forceps holding the dialyser, with the pipet, since the pipet has been dipped into the albumen. The serum should flow from the pipet directly to the bottom of the dialyser. If many dialysers are to be tested, it pays to occasionally change the pipet or at any rate to be careful not to get any saliva into the pipet, as saliva contains dialysable substances which react with ninhydrin.

3. Washing the dialyser after the albumen has been placed into it: While the filled dialyser is being held with the sterile forceps at its upper edge, a broad dry sterile clamp grasps it tightly just above the level of its albumen contents. While holding the dialyser with the clamp the inside above the point where it is clamped, is now irrigated with sterile distilled water from a wash bottle, this washes out any albumen which may have touched the inner wall during filling. The water remaining inside the dialyser above the clamped point, is now milked out with another dry sterile forceps. The dialyser is now again grasped with a sterile forceps at the upper edge, the broad clamp is removed and placed at the upper edge of the dialyser, when the outer wall is similarly washed off for the same purpose. The broad clamp is then removed while the dialyser is again held with the forceps, never should the fingers touch the dialyser, as they may be covered with perspiration which contains dialysable substances reacting with ninhydrin, and thus the test would be made unreliable.

4. Adding toluol to the contents of the dialyser: The contents of the dialyser are now covered with a layer of chemically pure toluol, from 0.5 to 1 cm. deep, with a dry sterile 1-c.c. pipet. The same amount of (measured) toluol should be placed in each dialyser. There must be enough so that it does not all evaporate when the dialyser is placed in the incubator for twenty-four hours. If it all evaporates the rest of the contents of the dialyser (serum) may evaporate and the result of the test would be inaccurate. The toluol also prevents putrefaction of the dialyser's contents.

5. Placing the filled and washed dialyser in the container and incubator: 20 c.c. of sterile freshly distilled water are placed in each container, which has been previously sterilized. The filled and washed dialyser held by the sterile forceps, is then placed into this water, then the water is covered with a layer of C.P. toluol, from 0.5 to 1 cm., the latter running down the outside of the dialyser as it is

placed with a sterile pipet into the container. The same amount of toluol must be put into each container. This again has a twofold object—to prevent putrefaction and evaporation of the container contents. There must be enough toluol in the container, so that some will still be found in the container after sixteen to twenty-four hours in the incubator, otherwise the water in the container will evaporate and the solution will become too concentrated and our results will be inaccurate. The quantity of water left after incubation should be the same in each container. After the dialyser is in the container, the latter is stoppered with sterile cotton, the dialyser being pushed down *ad lib* with the cotton. The dialyser should not, however, touch the floor of the container. The level of the contents of the dialyser below the toluol, should be just below the level of the water in the container; this can all be regulated with the cotton cork. The container with its contents is now placed in the incubator at 37.5° C. (the temperature must not vary). The length of time the dialyser is kept in the incubator with the albumen makes no difference, as the dialyser should let none through, no matter how long it is left in the incubator; twenty-four hours however are long enough.

6. Removal of the fluid to be tested, from the container: After removing the container from the incubator, the dialyser is removed with a sterile forceps, its contents are washed out and it is immediately placed in running water, where it remains for two hours. Now the contents of the container are shaken up and allowed to stand a few minutes to allow the toluol to come to the top again. Then 10 c.c. of the watery contents (hereafter called "dialysate"), of the container are removed with a dry sterile 10-c.c. pipet. The finger is kept on the end of the pipet as it is introduced to the bottom of the container, in this way we avoid getting any of the toluol which is floating on top, into the pipet. A fresh dry sterile pipet is used for each dialysate. The 10 c.c. are placed in a dry sterile test-tube (7 by $\frac{3}{4}$ inch) to be treated with ninhydrin. The remainder of the dialysate, about 9 c.c., is removed with the same 10-c.c. pipet, and placed in a dry sterile test-tube for the biuret test.

7. Testing the dialysate for albumen: This should be done with biuret and ninhydrin, but not with ninhydrin alone. The biuret reacts to albumen and to peptone, but not to amino-acids. Ninhydrin reacts with an amino-group in the alpha position to the carboxyl group. If ninhydrin is used alone, it will not detect very small quantities of albumen, since its positive reaction with albumen

depends upon the free amino-group in the albumen molecule and the latter does not contain much amino-acid. Another reason for ninhydrin not detecting very small quantities of albumen is, because it will not detect minute quantities of amino-acids. If we use ninhydrin to detect albumen, the container with the dialyser should be left in the incubator at least twenty-four hours, so that as many albumen molecules as possible will come through, if the dialyser is such as to let albumen through. The biuret test is done best in a test-tube. To 9 c.c. of the dialysate in the test-tube, 2.5 c.c. of a 33 $\frac{1}{3}$ per cent. solution of sodium hydrate are added. The mixture is well shaken up, but not with the finger on top of the test-tube, for in this way substances in the perspiration, giving a biuret reaction, may contaminate the tube contents. Then 1 c.c. of a 1 to 500 copper sulphate solution is allowed to flow down on the inner side of the test-tube so that it forms a layer on top of the mixture. A violet or pink ring at the junction of the mixture and the copper solution, in transmitted daylight, is considered a positive biuret reaction and the dialyser which was in this dialysate is discarded, as we have proven that it permits albumen to diffuse through its walls. The writers find the biuret reaction hard to read and consequently always do the nonhydrin test as well. The latter is carried out as follows: To 10 c.c. of the dialysate in the test-tube (7 by $\frac{3}{4}$ inches), 0.5 c.c. of a 1 per cent. ninhydrin solution is added with a standardized sterile 1-c.c. pipet, then the mixture is boiled exactly one minute. The details of this boiling will be mentioned later under "The actual testing of a given serum for ferment." The amount of fluid left in the test-tube after the one minute boiling should be the same for each dialysate boiled, it should be measured immediately after boiling with a 10-c.c. graduate and then should be poured back into the test-tube for reading. Any violet tinge in transmitted light at the end of one-half hour standing means that the dialyser permitted albumen to permeate through its walls. How to read color will be mentioned later under "The actual testing of a given serum for ferment." The ninhydrin reaction must be negative before a dialyser can be accepted as being impermeable to albumen.

8. Cleansing the dialyser: As soon as the dialyser is taken out of the container, its contents are washed out and it is permitted to remain in running tap water for two hours.

9. Storing the dialysers: When taken out of the running water they are placed in boiling distilled water for a half minute. They are then removed from the latter with dry sterile forceps and

placed in a dry sterile glass-stoppered jar. The jar is filled with one-third chloroform, one-third sterile distilled water, and one-third toluol. The jar must be filled to the top, so that the stopper dips into the toluol. The jar is then kept in the ice-box.

Materials Necessary to Test for Permeability to Peptone at the Same Rate.—The same articles are needed as were required to test for impermeability to albumen, with the exception of the first six mentioned under that heading. In addition we need:

A 1 per cent. solution of pure "Seidenpeptone" (Farbwerke Hoechst) 2.5 c.c. per dialyser. Dialysers which have been found not to let albumen diffuse through their walls.

Testing dialysers for permeability to peptone at the same rate: 1. Sterilizing the dialysers: Only those which did not permit albumen to diffuse through their walls are tested. With sterile forceps they are removed from the jar in which they were stored and thrown for one-half a minute into boiling distilled water. The same technic is employed as before (see page 604, "Sterilizing the dialysers").

2. Filling the dialyser with 1 per cent. "Seidenpeptone" solution: The same technic is employed as when testing for impermeability to albumen, except that 2.5 c.c. of a 1 per cent. pure "Seidenpeptone" solution (Farbwerke Hoechst) are used, instead of egg or serum albumen (see page 604, "Filling the dialysers"). The writers have shown (*Bulletin of the Lying-In Hospital*, June, 1913) that "Farbwerke Hoechst Seidenpeptone" is pure and that some other peptones cannot be used.

3. Washing the dialysers after the peptone has been placed into them: The technic is the same as when testing for the impermeability to albumen (see page 605, "Washing the dialyser after the albumen has been placed into it").

4. Adding toluol to the dialyser contents: The technic is the same as when testing the dialysers for impermeability to albumen (see page 605, "Adding toluol to the contents of the dialyser").

5. Placing the filled and washed dialyser into the container and the incubator: The technic is the same as when testing for impermeability to albumen (see page 605, "Placing the filled and washed dialysers in the container and incubator") except that the container with the dialyser is left in the incubator sixteen hours and no longer:

6. Removal of the fluid to be tested, from the container: The technic is the same as when testing for impermeability to albumen (see page 606, "Removal of the fluid to be tested from the

container"), except that only one test-tube (7 by $\frac{3}{4}$ in.) is filled with 10 c.c. dialysate to be treated with ninhydrin.

7. Testing the dialysate for peptone: To 10 c.c. of the dialysate in the test-tube (7 by $\frac{3}{4}$ inches) 0.2 c.c. of a 1 per cent. watery solution of ninhydrin are added by means of a dry sterile standardized 1-c.c. pipet. The mixture is boiled exactly one minute. The details of this boiling will be mentioned later under "The actual testing of a given serum for ferment." The amount of fluid left in the test-tube after the one minute boiling should be the same for each dialysate boiled, it should be measured immediately after boiling with a 10-c.c. graduate, and then should be poured back into the test-tube for reading. Only if the amount of fluid left after boiling is the same (evaporation the same), will similar violet shades represent dialysers of equal density. Any violet color at the end of one-half hour standing means a positive ninhydrin reaction and therefore the dialyser permitted peptone to diffuse through its walls. All those dialysers which give no reaction, or a reaction which is too strong, or too weak, are discarded. Only those which give the same shade of violet are accepted. How to read color will be mentioned later under "The actual testing of a given serum for ferment."

8. Cleansing and storing the dialysers: The technic is the same as after testing for the impermeability to albumen (see page 607, "Cleansing and storing the dialyser"). Those which have not permitted albumen to diffuse through their wall, but did let peptone through at the same rate, are numbered with indelible ink before boiling and storing.

Method of Obtaining Serum for a Test. Necessary Materials.—Rubber tourniquet for arm.

Tincture of iodine for skin over vein.

Three dry sterile needles for puncturing vein. One for serum to be tested, one for serum from a known pregnant woman, one for serum from a known nonpregnant individual.

Three dry sterile 25-c.c. test-tubes (one per serum) to collect blood in.

Sterile cotton stoppers for test-tubes.

Nine dry sterile pipets, not graduated, made by pulling apart glass tubing in blow flame. Rubber ends for same. Used to transfer serum from tube to tube.

Electric centrifuge and six centrifuge tubes.

Fifteen cubic centimeters of blood from the individual whose serum is to be tested, 15 c.c. each from a known pregnant and non-pregnant individual.

Adhesive plaster for covering skin puncture.

Sterile gauze sponges for pressure over skin puncture after removal of needle.

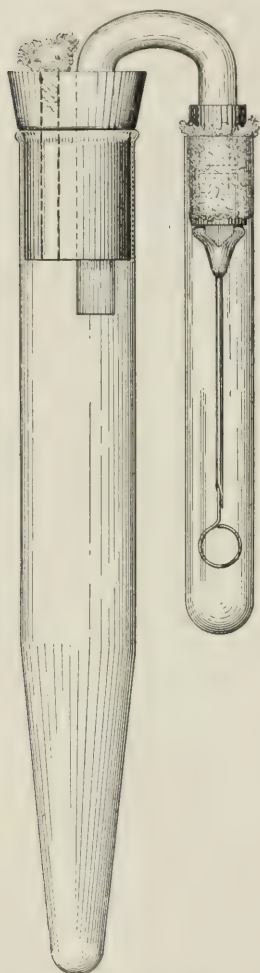


FIG. 1.—Apparatus for collecting blood from the median basilic vein, showing needle and test-tube.

Six dry sterile test-tubes with sterile cotton stoppers for the serum after centrifuging.

If the serum is collected for testing dialysers for impermeability to albumen, we use a large needle and a large flask to obtain 12 ounces.

How to obtain serum: This must not be hemolysed, hence we must exercise great care in collecting the blood. After applying a rubber tourniquet around the arm and tincture of iodine over the cubital space, a dry sterile needle is plunged into the median basilic vein and 15 c.c. of blood are allowed to flow into a dry sterile test-tube. The writers use an apparatus combining needle and tube. This is composed of a test-tube fitted with a rubber cork having two holes. Through one of the holes passes a piece of glass tubing which is curved like the inverted letter U. One end of the tube projects into the test-tube, to the other end a No. 18 Luer needle is attached by means of a small piece of rubber tubing. The needle is covered with a test-tube which fits over the rubber tubing to prevent contamination. The other hole in the rubber stopper in the test-tube permits the air to pass out of the tube as the blood rushes in, this is lightly packed with cotton to prevent contamination of the tube. The entire apparatus is sterilized by dry heat at 140° C. for one hour. It is best not to squeeze the arm in order to hurry the filling of the tube; when about 15 c.c. of blood have entered the tube, the needle is withdrawn and the tube is stoppered with the sterile cotton plugs (when the apparatus is used this is unnecessary). The tube is now permitted to stand at room tempera-

ture for from two to three hours. During this time enough serum (4 to 5 c.c.) separates. Separating the clot from the tube to free serum below, is a dangerous procedure, on account of the liability of hemolysis. With a dry sterile nongraduated pipet, the serum is removed and placed into a dry sterile centrifuge tube and centrifuged for ten minutes, to throw down any red cells it may contain. This serum is again pipetted off into another centrifuge tube, and the latter centrifuged for ten minutes. Finally the serum is pipetted into two dry sterile test-tubes, one for the test proper and the other for the control with inactivated serum. There must be at least 2 c.c. of serum in each of these tubes. Two such test-tubes with serum are obtained from the blood of the individual upon whom a diagnosis is to be made, two from the blood of a known pregnant woman, and two from the blood of a known non-pregnant individual. Any red cells left in the serum will be broken up later in the incubator and thus ferments will be liberated which will spoil the test. While the writers have not used the spectroscope to make certain that there is no hemoglobin in the serum, it is used by some investigators. The serum must not be more than twelve hours old when used for the test. The serum should contain few or no dialysable substances, hence it is best collected after fasting. The serum of cancer and fever patients, and those with large hematomata, exudates, and abscesses contains small amounts of amino-acids (dialysable substances).

CONTAINERS.

These must be of the same size for all tests and controls. In most of the writers' tests, glass tubes of such a size were used so that when the No. 579a Schleicher and Schuell dialysers were placed within them there was a space of 0.25 cm. between the dialyser and the wall of the tube. This space must intervene around that part of the dialyser which contains the placenta and serum, so that dialysation can go on all over. If any of this part of the dialyser comes in contact with the wall of the glass tube, dialysation will not be perfect. No matter with what care they are placed in the tubes, they do not stand absolutely perpendicularly in the tubes; they always tilt a little bit and a small portion of the end of the dialyser will come in contact with the tube. Of late the writers are using Erlenmeyer flasks, in which the dialysers cannot tilt much since the upper empty portion of the dialyser is in the neck of the flask. In this way it almost stands erect and the lower part of the

dialyser nowhere touches the wall of the flask; in other words dialysation is almost perfect. The neck of the flask must not however be too narrow, as there must not be a tight fit between the neck of the flask and the dialyser. Less expensive than Erlenmeyer flasks are small wide-mouthed bottles, as suggested to us by Dr. Strong of the Woman's Hospital in New York.

TEST-TUBES.

We use test-tubes 7 by $\frac{3}{4}$ inches for boiling with ninhydrin. This length does not readily permit the usual 10 c.c. contents to boil over when the boiling is active. No matter what the size, it must be the same for the tests and controls, for two colored solutions of the same concentration will appear to have different tints in tubes of different diameters, furthermore, evaporation goes on at a different rate in tubes of different widths.

To Make 10 c.c. of a 1 Per Cent. Ninhydrin Solution. Materials Necessary.—One-tenth gram Farbwerke Hoechst ninhydrin.

Balance.

Sterile watch glass.

Sterile paper to put on watch glass.

Dry, sterile, blue, glass-stoppered bottle.

Ten cubic centimeters sterile freshly distilled water.

One dry sterile 10 c.c. pipet.

Farbwerke Hoechst market ninhydrin in 0.1 gm. vials. This must be reweighed under sterile conditions, as all the tubes do not contain exactly 0.1 gm. The latter amount is added to 10 c.c. of sterile freshly distilled water. The crystals dissolve slowly in the water, hence the solution should not be used until they have dissolved absolutely. The solution is affected by light and is therefore stored in colored bottles. Acid fumes, mineral acids, and alkalies interfere with its action, as the writers demonstrated in a previous article (*Bulletin of the Lying-In Hospital*, June, 1913). The solution will keep seven days.

The Actual Testing of a Given Serum for Ferment after the Necessary Preliminary Preparations. Materials Necessary.—Previously prepared placental albumen in stock bottle.

Three dry sterile Petri dishes, on which albumen is weighed out.

Six sterile forceps.

Balance.

Four liters of sterile freshly distilled water.

Two 200-c.c. glass graduates, to measure the albumen by volume.

- Two small-mouthed, dry, sterile 250-c.c. glass beakers.
- Hard filter-paper (C. S. and S. No. 575).
- Two dry, sterile glass funnels.
- Ten test-tubes, dry, sterile (7 by 3/4 inches).
- Two dry, sterile 5-c.c. pipets.
- One dry, sterile, 1-c.c. standardized pipet for ninhydrin.
- Ten cubic centimeters of a 1 per cent. solution ninhydrin.
- Bunsen burner, tripod, asbestos mat.
- Clock with second hand.
- Dry sterile "Siedenstaebchen" or glass beads.
- Test-tube holder.
- Sterile blotting paper, to dry the albumen after boiling.
- O. K.'d dialysers in stock jar (6 per test).
- Two dry, sterile 800-c.c. beakers, for sterilizing dialysers.
- Two dry, sterile towels.
- Two cubic centimeters of serum to be tested for diagnosis, in sterile test-tube.
- Two cubic centimeters of serum to be tested inactivated, in sterile test-tube.
- Two cubic centimeters of a known pregnant serum, in sterile test-tube.
- Two cubic centimeters of the same known pregnant serum inactivated, in sterile test-tube.
- Two cubic centimeters of a known nonpregnant serum in sterile test-tube.
- Two cubic centimeters of the same known nonpregnant serum inactivated, in sterile test-tube.
- Six dry, sterile 1.5-c.c. pipets.
- One dry, sterile 20-c.c. pipet, for filling container.
- Hot water bath and thermometer, for inactivating.
- One dry, sterile abdominal clamp, to grasp dialyser transversely.
- Wash bottle.
- One pint C. P. toluol with one 1-c.c. pipet for same.
- One dry sterile 3-c.c. pipet for toluol.
- Incubator at 37.5° C., not to be used for any bacteriological work.
- Six dry, sterile containers (for one test and controls).
- Six sterile cotton stoppers for containers.
- Six dry, sterile 10-c.c. pipets.
- One 10-c.c. measuring glass, for measuring remaining fluid after boiling dialysate.
- Chloroform.

One dry, sterile, glass-stoppered jar for dialysers.

1. Retesting the previously prepared placental albumen for dialysable substances: Three grams of the tissue are required for each test and its controls, 0.5 gm. each for the serum to be tested and its control, 0.5 gm. each for a known pregnant serum and its control, 0.5 gm. each for a known nonpregnant serum and its control. The placental albumen is removed from the stock bottle with a sterile forceps and placed on a sterile Petri dish; a little more than the amount needed is weighed out. This amount is now retested for the absence of dialysable substances as described above (see page 601, (c) "To test for the absence of dialyzable substances") *i.e.*, it is boiled in five times its volume of sterile freshly distilled water, the water is filtered, and 5 c.c. of it are boiled for one minute with 1 c.c. of a 1 per cent. ninhydrin solution, etc. If after two such "retesting boilings" in five times the volume of water there are still dialysable substances present, we discard the tissue.

2. Weighing out 0.5-gm. portions of the retested and O. K.'d albumen: The tissue is first dried between two layers of sterile blotting paper and then weighed out in 0.5-gm. portions, the latter are then placed on a sterile Petri dish with sterile forceps and covered.

3. Sterilizing the dialysers: Six O. K.'d dialysers (for one test and its controls) are removed with a sterile forceps from the stock jar, they are washed in sterile distilled water in an 800-c.c. sterile beaker and then placed in boiling sterile distilled water for one-half minute in another sterile 800-c.c. beaker. The same technic is employed as when testing dialysers for impermeability to albumen (see page 604, "Sterilizing the dialysers").

4. Filling the dialysers with serum and albumen: The dialysers are picked up from the sterile towel with sterile forceps; an assistant uncovers the Petri dish containing the 0.5-gm. portions of placental albumen; with sterile dry forceps he places 0.5 gm. into the dialyser, dropping it directly to the bottom. Great care must be exercised not to get any albumen on the outside wall, on the inside wall, or on the edge of the dialyser, or on the forceps holding the dialyser. The assistant now removes 1.5 c.c. of the serum to be tested from its test-tube with a dry sterile 1.5-c.c. pipet and places it directly on the bottom of the dialyser over the albumen. Here again, great care must be exercised not to touch the outside wall, the inside wall, the edge of the dialyser, or the forceps holding it, with the pipet, since the latter has been dipped into the albumen.

5. Washing the dialyser after the albumen and serum have been placed within it: The same technic is employed as when testing

dialysers for impermeability to albumen (see page 605, "Washing the dialyser after the albumen has been placed into it"). If any small particles of placenta get on the inside wall of the dialyser and remain there uncovered by toluol, they will putrify during the sixteen hours incubation and the test may be spoiled.

6. Adding toluol to the dialyser contents: The technic is the same as when testing the dialysers for impermeability to albumen (see page 605, "Adding toluol to the contents of the dialyser").

7. Placing the filled and washed dialysers into the container and incubator: The technic is the same as when testing dialysers for their impermeability to albumen (see page 605, "Placing the filled and washed dialysers in the container and incubator"). The dialysers, however, are left in the incubator just sixteen hours and no longer.

8. Controls: For reasons stated in the writers' previous article (*Bulletin of the Lying-In Hospital*, June, 1913) a control with placental albumen and the serum to be tested inactivated, is essential, *i.e.*, the contents of the control dialyser, is the same as the dialyser which contains the serum to be tested, each contains serum and placental albumen, the only difference being, that the serum in the control surely contains no ferment, since it has been inactivated. Only in this way can we prove that a positive reaction with the serum to be tested and albumen is due to ferment; this control also checks up the placental albumen. In addition to the control mentioned, a known pregnant serum with placenta, and a known nonpregnant serum with placenta, with their controls of inactivated serum and albumen, are run through. We thus have five actual controls to make, whenever we test a serum for ferment, *viz.*

1. The serum to be tested inactivated with placenta.
2. A known pregnant serum with placenta.
3. The same known pregnant serum inactivated with placenta.
4. A known nonpregnant serum with placenta.
5. The same known nonpregnant serum inactivated with placenta.

The technic in filling, washing, etc., the control dialysers, is the same as that described above for the serum to be tested.

9. Inactivating serum: The serum in a test-tube is placed in a hot water bath for thirty minutes at 60° C.

10. Removal of the fluid to be tested from the container: The technic is the same as when testing the dialysers for their impermeability to albumen (see page 606, "Removal of the fluid to be tested from the container"), except that since no biuret is to be done with the remaining dialysate after 10 c.c. have been removed,

the following procedure should be followed. To avoid all sources of error this remaining dialysate and toluol should be poured into a small graduate glass and the amount of watery fluid remaining noted. The amount of dialysate remaining in each container should be the same.

11. Testing the dialysate for dialysable substances, *i.e.*, whether ferment was present or not: To 10 c.c. of the dialysate in the test-tube, 0.2 c.c. of a 1 per cent. watery solution of ninhydrin are added with a 1 c.c. dry sterile standardized 1-c.c. pipet. The mixture is then boiled exactly for one minute as follows: The Bunsen flame is held under the tube, the one minute is counted from the time the first bubble appears on the inside wall of the tube, the boiling must be active, a few seconds after the bubbles first appear the boiling is active, then the flame is brought to the edge of the tube or held farther away from it and boiling is continued with a lowered flame. During boiling there must be no sputtering over: the latter is prevented to a degree by first placing a few sterile "Siedenstaebchen" (thin glass rods $1/2$ in. in length) or sterile glass beads in the test-tube before boiling. The boiling is one of the most important steps in the entire test. The amount of the evaporation in the one minute boiling must be the same with the 10 c.c. of water, against which the serum for diagnosis was dialysed, as with the 10 c.c. dialysate of each control. Many of the dialysates may contain some dialysable substances but not in sufficient quantities to be detected by one minute boiling with the amount of ninhydrin used. If the boiling is kept up longer than one minute or is too active during the prescribed one minute, the concentration of such a dialysate will be more than it should be, and a positive ninhydrin reaction may result with a nonpregnant serum. This in itself will not lead to wrong results, if the controls are similarly concentrated, but would lead to a wrong result if the dialysate of the controls were properly boiled one minute and thus gave a negative or weaker ninhydrin reaction. Again, if we do not boil long or actively enough, there may not be sufficient concentration to get a positive reaction with a pregnant serum and the result would be interpreted wrongly, due to improper boiling. The amount of concentration or evaporation must be the same in the test proper and all its controls, but we have not as yet determined just how many cubic centimeters the original 10 c.c. of dialysate had best be evaporated. To be certain that the evaporation is sufficient and the same, in test and controls, we must not only boil according to instructions, but must also measure the fluid remaining immediately after the one minute boiling; when test

proper and controls are not evaporated down to the same amount the results are discarded. After measuring, the fluid is poured back into the test-tubes and allowed to stand one-half hour before readings are made, then the color in the tubes is noted in transmitted daylight. This is best done by surrounding the test-tube with white gauze, excepting over a small area where the color is read, in this way all outside shadows are avoided. A clear watery, or yellow, or brownish, or reddish color is called a negative ninhydrin reaction. A violet color is a positive ninhydrin reaction.

12. Cleansing and storing the dialysers: The technic is the same as after testing for impermeability to albumen (see page 607, "Cleansing and storing the dialyser").

HOW TO INTERPRET A CASE AS PREGNANT OR NONPREGNANT.

1. Placenta and serum giving a negative ninhydrin reaction, when its control with inactivated serum and placenta also gives a negative ninhydrin reaction, is considered nonpregnant.

2. Placenta and serum giving a positive ninhydrin reaction when its control with inactivated serum and placenta gives a positive ninhydrin reaction of the same intensity, is still considered nonpregnant.

4. Placenta and serum giving a positive ninhydrin reaction, when its control with inactivated serum and placenta gives a negative ninhydrin reaction, is considered pregnant.

5. Placenta and serum giving a positive ninhydrin reaction, when the control with inactivated serum and placenta gives a positive ninhydrin reaction but of a distinctly lighter shade than the placenta and serum, is still considered pregnant.

THE NEEDLESSNESS OF COMBINED GENERAL AND LOCAL ANESTHESIA AS SHOWN BY THE RESULTS IN THE LAST ONE THOUSAND CASES ADMITTED TO THE GYNECOLOGICAL DEPARTMENT OF THE HOWARD HOSPITAL.*

BY

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I HAVE avoided writing a formal paper on this subject for obvious reasons. My remarks have been suggested by a recent article by Dr. Crile† on his anoci-association theory, and what I have to say

* Read before the Philadelphia Obstetrical Society November 6, 1913.

† "Some Newer Methods of Reducing the Mortality of Operations on the Pelvic Organs," Geo. W. Crile, *Journal of the A. M. A.*, Oct. 25, 1913.

might be construed as an attempt to criticise that accomplished operator, original surgeon and agreeable gentleman, which is far from my purpose. There were two thoughts in my mind in this connection. One to suggest some uniform system of hospital statistics; the other to elicit a discussion as to the necessity of combined local and general anesthesia to obtain the best results in morbidity and mortality. I would like, first, to elicit the opinion of our members upon the subject of hospital statistics. It seems to me most desirable that there should be some agreement as to a uniform plan. In the 1000 cases of a general surgical service reported by Dr. Crile, I was struck by the unlikelihood of a mortality of eight-tenths of 1 per cent. in such a service which must have included all sorts of acute conditions and injuries as well as operations deliberately selected. While Dr. Crile makes no specific statement in this respect, I felt that these statistics must have been based on selected cases. The question arises whether that is the best way to present hospital statistics. In Dr. Crile's paper nothing is said on this point, and, thinking over the matter, I determined to set an humble example among ourselves by a rigorously accurate presentation of the results of operative work in a general gynecological service. I therefore instructed my resident physician to go over my books in the Howard Hospital, beginning last week and counting backward, in the last 1000 cases admitted, and to record every death of any one from any cause, who had received an anesthetic, in any kind of an operation. In addition, I went over the histories myself and also the Superintendent's books which included every one of the 1000 patients admitted going back to March, 1911. As a result, I found a mortality of 1.5 per cent. or fifteen women in the last 1000. Had I juggled with these statistics I could have made my results very different. Four of the fifteen deaths were from operations on advanced carcinoma of the cervix; one involved resection of both ureters, their implantation in the anterior wall of the bladder with resection of the base and fundus: this woman lived a week. Another was simply an exploratory section: the disease was too advanced for any operation. A third died of metastatic cancer in the lungs, the immediate cause of death being hemoptysis. The fifth death was in a woman with myocardiac degeneration. It was a plastic operation. The patient suddenly sat up in bed one night a week after the operation and dropped over dead. Another death followed a simple perineorrhaphy in a poor negress in the free ward whom I turned over to my resident physician, a man of some experience, who got a fellow resident to anesthetize for him. The woman died on the table, presumably from the anesthetic,

straight ether. Another death was in a case of unlimited streptococcic suppurative peritonitis following a septic abortion, practically a hopeless condition, still another was a recurrent pseudomyxoma peritonei, almost invariably fatal. The ninth was a phthisical patient sent to me to have her pelvic organs patched up, but she died from the progress of her pulmonary tuberculosis before she left the hospital. The anesthetic in this case was gas and chloroform. With the exception of these nine cases in which the result was almost a foregone conclusion, or was one for which neither the operator nor the anesthetic could fairly be held responsible, I could have reduced my mortality to 0.6 per cent.

But as already stated, one of my objects is to see if we cannot agree upon some recognized system of hospital statistics which we can study to advantage to ourselves and to our patients, and I think the only plan is to record exactly what happened and then to analyze the results.

My second thought was to elicit opinions as to the desirability of the combined anesthesia that Dr. Crile advocates with great ingenuity and plausibility. There is not one of us who questions his theory of anoci-association, in as far as it concerns the elimination of fright and apprehension before an operation. There are selected cases in which the obliteration of all sense of fear and the diminution thereby of the danger of shock is of the greatest advantage and perhaps a life-saving principle. But I, for one, would dispute the advantage of the double anesthesia—the general and local anesthesia. It strikes me as rather important that the profession should come to a conclusion on this point. It occurred to me that, much as I respect Dr. Crile as a surgeon, much as I admire him, much as I like him, for I am proud to claim a personal acquaintance—it occurred to me that his paper might do harm with operators of small experience. We can readily picture to ourselves the possible results of the general anesthetization of the patient and then the local anesthetization of each tissue or structure to be incised or removed; the loss of time, the reduction of vitality. There must be more suppurating wounds, a larger percentage of morbidity and possibly a higher mortality. The time consumed in the hands of an inexperienced surgeon would be of great import. If we insist upon local anesthesia with general anesthesia, each operation would take a greater length of time. Or if we hurry in attempts to secure the former, we do not get the local anesthesia, and I cannot see the good of the procedure. On these two points, Mr. President, I think we should have some expression of opinion: (1) The best method of presenting hospital statistics; (2) an opinion as to the

possible advantages or disadvantages of this combined local and general anesthetization, on which, you will remember, if you recollect Dr. Crile's paper, he seems to base his claim for an extraordinarily low mortality in a general surgical service; 0.8 per cent. in 1000 cases.

AQUEOUS SOLUTIONS OF IODINE IN THE TREATMENT OF GONORRHEA IN WOMEN.*

BY

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AMONG the minor gynecological conditions treated by the general practitioner, few present greater difficulties than gonorrheal infections of the lower genital tract, including vulva, urethra, vagina, and cervix uteri. These infections in women are of greater importance than similar conditions in men, because of the wider extent of mucous membrane involvement in the former.

The insidious onset of gonococcal infection in the female with the frequently obscured clinical course and the sociological questions associated with it, render the history of the case of little value in arriving at a diagnosis. We are forced, therefore, to rely almost entirely for a diagnosis upon the physical and microscopical findings. This is particularly true in the subacute and chronic types of the disease. Glandular structures are the sites of predilection of gonococcal invasion. The ducts of the infected glands appear on the surface as red, elevated, pouting orifices. The infection in these foci has a marked tendency toward chronicity, often proving a prolific source for the periodic transmission of the disease to the male.

The cases forming the basis of this paper have been studied in the Gynecological Dispensary of the Jefferson Medical College Hospital. This series includes only cases in which the gonococci were demonstrable in the discharges. Smears were made from the urethra, cervix, vagina, and Bartholin's gland. Practically all of the cases were of the chronic or subacute type.

Repeated examinations of the discharges were made and in several instances gonococci were demonstrable only during the menstrual period or immediately after cessation of the flow. By far the most frequent site of lodgment of the gonococcus was the cervix uteri, next in order of frequency, the urethra, and least often the vulvovag-

* Read before the Obstetrical Society of Philadelphia, November 6, 1913.

inal glands. Cervical smears were made by first wiping away the mucus from the external os through a bivalve speculum, and procuring some of the secretions from within the cervical canal by means of a cotton-tipped probe. A drop of pus could at times be found at the external urinary meatus after "milking" the urethra, and if unsuccessful, intraurethral smears were made. By compressing the vulvovaginal gland, a droplet of pus would show at times at the orifice of the duct.

For routine staining Loeffler's methylene blue was used and where the diplococci were not characteristic, Gram's method of staining was resorted to. Gonococci can be distinguished with fair accuracy by the following points:

- (a) The characteristic diplococcal arrangement of the organism.
- (b) The intracellular position of the germ.
- (c) The decolorization of the coccus by Gram's method of staining.
- (d) The almost invariable absence of other bacteria.

At times it is by no means an easy matter to make a diagnosis. It has been pointed out by Bumm that five different diplococci, closely resembling the gonococcus, have been isolated from the cervical or vaginal secretions in suspected cases. Four of these are Gram negative, the fifth Gram positive, the chief distinction being in their cultural properties. Furthermore, as noted by Wertheim, the characteristic shape and staining properties apply, chiefly, to young and vigorous organisms. The older cocci tend to become more spherical and stain less readily.

In all, two hundred and twenty-two slides were examined. Of these eighty-three smears were from the cervix, forty-four of which were positive, and twenty-nine negative. Ten were inconclusive and required a second specimen. Of the sixty-four urethral smears, thirty-seven were positive, twenty-one negative, and six inconclusive. Of the fifty-three vaginal smears there were but seventeen positive, twenty-eight were negative, and eight inconclusive. Smears made from the secretions of Bartholin's glands were sixteen in number; of these thirteen were positive and three negative. Of six smears taken from the vulva, four were positive and two negative. The presence of other organisms in the pus obtained from the vagina often mars the characteristic picture of the gonococcus, and it is for this reason that vaginal smears prove so unsatisfactory for microscopical examination. As noted above the gonococcus is rarely present with other bacteria. In the vagina this would suggest that the latter organisms have a deleterious effect on the gonococcus. This fact has been taken advantage of by some clinicians and

cultures of the lactic acid bacillus have been introduced in these cases in place of Döderlein's acid forming bacillus, in the absence of which the gonococcus has found a ready lodgment. In a persistent irritating vaginal discharge, where the gonococci are not demonstrable by the microscope, recourse should be had to cultures.

Having ascertained the site of the infection and having established a diagnosis by rational clinical and laboratory findings, therapeutic measures were instituted with a view of combating the focus of infection and preventing its spread. The treatment of gonorrhea in recent years has changed but little and is still based on principles of absolute cleanliness, the use of drugs for their diuretic, sedative, and bactericidal action, free water drinking, and a nonstimulating diet. More recently iodine has been brought forward as an ideal antiseptic and has been employed extensively in surgery in the preparation of the field of operation and in the treatment of infected wounds. It has also been found of value in infections of the internal generative organs.

I was led to its use in the treatment of gonorrhea in the female by the peculiar qualities that it has over the other antiseptics:

(a) The action of iodine is penetrating and when we recall that the gonococci frequently find lodgment in the subepithelial structures and in the deeper glands, its advantages in combating this organism are quite apparent. Other antiseptics as is well known act on the surface epithelium only.

(b) It is a stimulant and counterirritant and in stronger solutions causes exfoliation of the epithelium of the mucosa which further enhances its bactericidal action in the deeper structures.

(c) It is an alterative thereby causing changes in the nutrition of the involved area, aids in the absorption of exudates and tends to restore altered functions in the diseased glands.

(d) The aqueous solution of iodine was used instead of the tincture, for alcohol, even in dilute solutions, gives rise to smarting and burning when applied to an acutely inflamed surface, and has a less solvent action on tenacious mucus. The liquor iodi compositus (U. S. P.), Lugol's solution, was the preparation employed.

In acute and subacute cases where vaginitis or vulvitis was present, the patient was directed to use one teaspoonful of the solution to two quarts of warm water as a douche twice daily. In the chronic and mildly inflammatory cases the strength was gradually raised from one to two teaspoonsful or until the patient began to experience a burning or smarting sensation indicating the limit of increase.

The cervix was the most frequent site of lodgment of the gonococcus and because of the deep penetration of the organism into the cervical glands it was found quite difficult to eradicate them. The patient was directed to appear at the dispensary for treatment twice weekly. The cervix was exposed through a bivalve speculum, the tenacious mucus adhering to the external os was removed, and by means of a cotton-tipped applicator, Lugol's solution, in full strength, was carried into the cervical canal as far as the internal os. The canal as well as the portio vaginalis was thoroughly swabbed with the solution. A saturated solution of iodine crystals in pure phenol was used in making applications to the cervical canal in the more obstinate cases and was found efficacious in eradicating the infection.

In the involvement of Bartholin's glands where the ducts were patulous, with pouting red orifices, one or two applications with the phenol-iodine solution destroyed the diseased mucosa with subsequent cicatrization of the duct. A few topical applications with Lugol's solution to the dilated orifices of the suburethral follicles, found in the vestibule, effected a cure in most instances. Skene's glands were the seat of a chronic inflammation in one of the cases; the orifices were exposed through a urethral wire speculum and the duct cauterized with the phenol-iodine preparation.

The urethra in several cases was thickened and infiltrated, with enlarged follicles along the course of the canal. The dilatation of the urethra by means of Hegar's dilators with light massage of the follicles over the dilator and with subsequent instillation into the urethra of the following solution:

Iodine (crystals).....	gr. v.
Albolene.....	oz. i.

greatly enhanced the restoration of the parts to normal. The solution was retained in the canal from three to five minutes. The dilator if covered with Finger's ointment is also of value in these cases.

Iodine crystals.....	gr. vi.
Potassii iodid.	gr. xxx.
Olei amygdalæ.....	oz. i.
Adeps lanæ.....	oz. ii.

Under the above outlined treatment the thick and copious yellow discharge soon disappeared and was replaced by a thin whitish watery secretion in which gonococci were absent. A solution of zinc sulphate and alum one teaspoonful of each to two quarts of water used as a douche twice daily helped to limit the latter discharge.

Of the twenty-five cases that comprise this series, eighteen were cured, after treatment from four to ten weeks. The term "cured" is used here to denote the disappearance of gonococci from the secretions, an amelioration of symptoms, and cessation of the discharge. Two of the remaining seven cases were markedly improved but still showed a few gonococci in the discharges from the cervix, the source of which, in all probabilities was reinfection from the husband, who also had gonorrhea, or possibly from the Fallopian tubes with patulous uterine orifices discharging the contents into the uterine cavity and thence through the cervix, or from the deep cervical glands beyond the reach of local medication. Of the two cases that complained of intrapelvic symptoms, prior to the commencement of treatment, both were subsequently operated upon for chronic salpingo-oophoritis, though the local condition of the lower genital tract had cleared up. The other three cases that showed improvement were under treatment from four to five weeks but drifted away from view and treatment had to be discontinued. One patient developed symptoms of intrapelvic involvement shortly after applications were begun, but with expectant treatment and rest in bed, her condition soon improved. Three of the eighteen cases that were cured had abscesses of Bartholin's gland which required incision and drainage.

The results in this series of cases appear to justify the following conclusions:

(1) In gonococcal infections of the lower genital tract, iodine is a valuable agent in the treatment. It offers a more rapid, more thorough, and a more permanent improvement in the patient's condition than most other methods commonly in use.

(2) Gonococci disappear early from the secretions.

(3) Intrapelvic extension is far less frequent.

(4) The use of the cautery and strong caustics is obviated and hence less scarring results.

(5) The constitutional condition of the patient improves as a result of the early cessation of the profuse discharge.

(6) The rapid improvement and lack of pain noticed by the patient encourages her to continue with the treatment.

(7) The entire course of treatment is of comparatively short duration, and but little burdensome to the patient and physician, and lends itself readily both to dispensary and private practice.

CASE I.—K. B., aged seventeen, white, single, saleslady; complained of a vaginal discharge of eight months' duration, which recurred and abated at irregular periods from time to time. For

two months prior to coming under observation, the discharge had been incessant. Examination revealed a profuse purulent vaginal discharge, a vulvovaginitis and an erosion of the cervix. First came under observation on Feb. 25, 1911. Gonococci were present in the cervical and vaginal secretions. She was placed under routine treatment, as outlined above. On March 23, 1911, the discharge had greatly decreased in amount and was much thinner; gonococci were not demonstrable. On April 4, 1911, the discharge had entirely ceased and all symptoms had abated and subsequent examinations of the secretions showed absence of the gonococcus. Entire course of treatment was of five weeks duration.

CASE II.—G. M., aged seventeen, white, single, clerk. For two months prior to coming under observation noticed a profuse irritating vaginal discharge, and burning and frequency of urination. Examination revealed reddened large and small labia, a slight pouting of the urethral orifice, increased sensitiveness of the vaginal mucosa which showed a mild inflammatory condition. Gonococci were found in the urethra and vagina. First came under observation on December 13, 1910. Was placed under routine treatment. On January 6, 1911, the discharge had entirely disappeared, and the general health of the patient had much improved. On January 12, 1911, or four weeks after the beginning of treatment the gonococci had entirely disappeared from the discharges. Subsequent examinations of the patient showed no recurrence of the disease.

CASE III.—A. S., aged thirty, white, seamstress by occupation. For five months the patient has had burning on urination, and a profuse yellowish discharge with irritation of the labia and upper part of thighs. Smears on Nov. 27, 1910, from urethra and cervix and Bartholin's glands showed the presence of gonococci. On Jan. 28, 1913, all of the symptoms had disappeared and gonococci could not be found. In this case the pure phenol-iodine mixture was used to cauterize the inflamed pouting orifice of the duct of one of the vulvovaginal glands. After two months of treatment the patient was discharged as cured. After cessation of treatment no symptoms of recurrence were ascertainable for several months while the patient was under observation.

CASE IV.—M. S., twenty-four years of age, white, housework, married four years. Chief complaint of the patient was a profuse discharge, extending over a period of five months, coming on shortly after labor. The patient was in delicate health, had pains in limbs and back, and slight burning and frequent urination. Examination revealed gonococci in the cervical discharge on Jan. 31, 1913. Routine treatment was instituted on above date. On Feb. 18, 1913, the discharge had greatly decreased and but few gonococci were demonstrable. The patient's health had much improved. On Mar. 14, 1913, the smears from the cervix and urethra were negative, the discharge had entirely abated. The cervix which had formerly been of a dark red-bluish color had assumed the normal pinkish tint. Duration of treatment was six weeks.

CASE V.—B. W., twenty-one years of age, white, single, waitress.

Purulent vaginal discharge of five months duration. Examination Jan. 26, 1911, revealed a moderate cystocele and rectocele, purulent discharge covering vaginal mucosa, marked congestion of urethral meatus, and of ducts of vulvovaginal glands. Gonococci present in the urethral, cervical and in the vulvovaginal glands. The routine treatment was instituted. Four weeks after the coming under observation symptoms and physical signs showed marked improvement. The profuse yellowish discharge changed into a whitish mucoid secretion which showed absence of gonococci. This discharge rapidly cleared up under the zinc sulphate and alum douche.

CASE VI.—J. N., twenty-six years of age, white, single, practical nurse. Complained of pain in the lower abdomen and a slight vaginal discharge. Diagnosis of endometritis was made, and a small uterine fibroid was present. Examination of cervical smears showed presence of gonococci. Repeated examinations of the discharge after six weeks treatment showed the absence of gonococci with diminution of the uterine discharge.

CASE VII.—F. McK., eighteen years of age, single, white, milliner. Profuse yellowish discharge of three months duration. A vulvovaginitis and congestion of the urethral orifice was quite apparent on inspection. Gonococci were present in the cervical secretion. After three weeks treatment the gonococci had disappeared from the discharges and seven weeks after the treatment was begun, all symptoms had entirely abated.

CASE VIII.—S. L., twenty-five years of age, married, white, housework. At the time of her coming under observation the husband was being treated for a specific urethritis. Examination revealed a purulent vaginal discharge, a vulvovaginitis, and a cervix showing extensive erosions. Cervical discharges contained gonococci. She was placed under routine treatment and all signs and symptoms had abated after eight weeks. Repeated examination for gonococci showed their absence from the discharges.

CASE IX.—L. B., twenty-one years of age, married, white, housework. A frequency of urination and a burning, itching, and soreness of three weeks duration, was complained of by the patient. Examination showed the presence of gonococci in the urethra and cervix. After two weeks of treatment the patient felt much relieved and seven weeks after coming under observation the patient was discharged as cured.

CASE X.—H. B., twenty-five years of age, married, white, housework. Following last menstruation, one week ago, onset of present trouble was noted by the patient. A thick yellowish vaginal discharge appeared with considerable irritation of the vulva. These exacerbations have been noticed by the patient a previous menstrual periods, but subsided after a week or two. Examination of the cervical smears showed the presence of gonococci. The cervix was enlarged, pouting and eroded. For three months the patient had been under treatment at irregular periods after which time microscopical examination revealed the presence of a few gonococci at times but local conditions of cervix had greatly improved.

CASE XI.—S. S., twenty-two years of age, white, single. First came under observation October 1, 1911, with a syphilitic maculopopular eruption and a generalized glandular enlargement. An intravenous injection of salvarsan was administered on October 6, with a very happy result. The eruption and condylomata had entirely vanished within ten days, and the patient begun to gain in weight. On November 17, 1911, or five weeks after the salvarsan was injected the patient contracted acute gonorrhea with typical clinical symptoms of that condition. Treatment was instituted and was extended over a period of six weeks in conjunction with mercury and iodids for the associated lues. Absence of gonococci from the secretions was noted and treatment for the Neisserian infection was discontinued.

CASE XII.—L. Mc., twenty-six years of age, married, white, housework. For two weeks the patient noticed a vaginal discharge and a urethral irritation. The discharge of the urethra and cervix contained a few gonococci. A bilateral oophorectomy one year before had been performed. Routine treatment for five weeks cleared up the discharge, relieved the patient of all subjective symptoms, and subsequent microscopical examination failed to demonstrate the gonococci.

CASE XIII.—E. S., eighteen years of age, single, white, saleslady. For two months had had burning and frequent urination with occasional incontinence, had a profuse yellowish discharge for same period of time. Under the routine treatment the symptoms and physical signs subsided, the disappearance of gonococci noted, and the patient was pronounced cured after seven weeks treatment.

CASE XIV.—G. M., twenty-two years of age, married, white, cigar-maker. A leucorrhea, more marked when standing, had been troubling the patient for six months. Had abortion one year before. The cervix was boggy, red, eroded, and a thick tenacious discharge was noted at the external os. A mass of small size in the region of the right tube was felt on bimanual examination. Gonococci were demonstrated in the cervical secretions. After six weeks of treatment the discharge had practically disappeared but gonococci were still present. The husband was also being treated for gonorrhea. Two months later the patient was admitted to the hospital for an operation and the pelvic mass, noted above, proved to be a chronic salpingo-oophoritis. This possibly was caused by the previous abortion, or more probably, by the Neisserian infection.

CASE XV.—S. L., thirty years of age, widow, white, waitress. Complained of dysuria, pruritis, leukorrhea and menorrhagia for several months. Gonococci were demonstrable in the cervical discharges but were absent from urethra and Bartholin's glands. Treatment extending over a period of two months cured the patient of her ailment.

CASE XVI.—J. DeM., twenty-one years of age, white, married, housework. Had a bilateral oophorectomy performed four years prior to present trouble; since then she has not menstruated. For past five days has been complaining of frequent and scalding

urination. Examination revealed a slight discharge which contained the gonococci. The patient was under treatment for three months at the end of which time there was a marked relief of symptoms, but few gonococci were still demonstrable. The patient was irregular in her attendance at the dispensary and in her habits at home. The husband was also being treated for gonorrhea during this period.

CASE XVII.—I. E., nineteen years of age, white, single. Gave a history of onset of present ailment four months ago. For past few weeks noticed swelling in the region of Bartholin's gland on right side. Examination showed the swelling of the gland which liberated a moderate amount of thick pus on pressure. Treatment extended over two months with apparent cure of all symptoms and signs. The pure phenol-iodine mixture was used for the ducts of the vulvo-vaginal glands.

CASE XVIII.—G. W., twenty-two years of age, married, white, operator. A slight irritating, yellowish, vaginal discharge lasting for a period of three weeks was complained of by the patient. At her first visit to the dispensary gonococci were found in the cervix but were absent in the urethra. The patient was under treatment for four weeks, with relief of most of the symptoms and improvement of local condition. The patient disappeared from view and further observation of condition became impossible.

CASE XIX.—M. K., twenty-five years of age, married, white, housework. A history of a genital infection with a profuse yellowish discharge extending over a period of six weeks was elicited from the patient. Gonococci were found in the cervix. Routine treatment for five weeks caused their disappearance and two weeks later the patient was discharged as cured.

CASE XX.—M. S., twenty-two years of age, married, white, housework. When she came under observation, the husband was being treated for a gonococcal infection. She was desirous to know whether she also was infected. Physical signs showed a mild congestion of vaginal and cervical mucosa with a slight discharge from the urethra and cervix, and irritation of vulva and thighs. Gonococci were present in both urethral and cervical secretions. A tender mass the size of a small orange in the region of the left ovary was palpable. Occasional pain and tenderness was experienced in this location dating back to an abortion one year before. Routine treatment was instituted. Six weeks later symptoms and signs had improved and gonococci were not demonstrable, but the mass in the pelvis persisted. Six months later she was operated upon for a chronic salpingo-oophoritis.

CASE XXI.—M. H., twenty-one years of age, single, white, actress. For six weeks had symptoms of acute infection of genital tract. Examination revealed an eroded cervix, congested vulva and vestibule, and a purulent vaginal discharge. A few days later developed a pelvic peritonitis, necessitating her being confined to bed. One week later all intrapelvic symptoms had subsided, the discharges had greatly lessened and the signs of the acute inflamma-

tion of external genitalia had markedly subsided. The patient was compelled to resume her rôle as actress and left the city before completion of the treatment.

CASE XXII.—M. M., eighteen years of age, single, white, house-work. Vaginal discharge of two weeks duration, burning and itching of vulva and painful and frequent urination. For the past four days has had enlargement, with pain and tenderness over right Bartholin's gland, necessitating incision and drainage. Treatment for a period of five weeks caused all symptoms to subside and the microscopical examination failed to reveal the presence of gonococci.

CASE XXIII.—A. B., twenty years of age, single, white, cashier. For two weeks noticed a mass in the right labium. Examination revealed an abscess of Bartholin's gland. Secretions from urethra showed gonococci. Incision of gland with drainage and routine treatment of eight weeks relieved the patient of all symptoms.

CASE XXIV.—E. B., nineteen years of age, married, white, house-work. A yellowish vaginal discharge, with frequent and scalding urination was the complaint of the patient for about four weeks prior to her examination. An inflamed vulva and vagina, pouting and edematous urethral meatus and congested vestibule was noted. Gonococci were recovered from the discharges. Treatment for four weeks greatly improved the condition after which time the patient disappeared from view.

CASE XXV.—S. E., twenty years of age, single, white, clerk. One week ago noticed swelling of left labium major, with pain. A history of a probable onset of a genital infection was elicited on questioning, two months prior to her present trouble. Urethra and cervix showed the presence of the specific organism. The abscess of vulvovaginal gland was incised and drained and seven weeks later all traces of the infection had disappeared.

AMERICA'S CONTRIBUTION TO GYNECOLOGY.

BY

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THE tendency of Americans to laud everything foreign and view with common complacency all things American, is nowhere more apparent than in the enthusiastically received opinions of foreign writers and operators, to the well-nigh total neglect, or, at least luke-warm acceptance of the labors and results of our own countrymen. While in years we are not so old, yet in our contributions to the world's knowledge we are rich in experience and results.

America is the home of modern gynecology, and to-day has still a goodly number of most enthusiastic workers who are blazing the way along the pioneer front of this specialty.

American gynecology had its inception in the rural habitation of Virginia as early as 1791, when Dr. Boynham had the boldness to open the abdomen and remove an extrauterine fetus.

In 1806, Dr. Clark records the fact that he introduced his hand into the bowel and removed an extrauterine fetus by putting his fingers into its mouth and applying traction.

But the birth of American gynecology very properly dates from 1809, when Ephraim McDowell, of Kentucky, successfully removed an ovarian tumor weighing 22 pounds. When we think of all the surrounding conditions under which the operation was performed, we can surely feel a just pride for the boldness, courage, and dexterity of the great operator. His patient, Mary Crawford, travelled many miles on horseback to his home. It was a task of no ordinary undertaking, for in his own mind he knew that he was about to undertake an operative procedure, the practical results of which were absolutely and entirely unknown to the medical world. Yet within his own heart burned that fire of approbation that has come to all great men in the epoch-making periods of their lives. It came to McDowell, and though without trained assistants, without trained nurses, without modern antiseptics or appliances, knowing that outside the bolted and barred door of that rude hut stood an angry and sullen group of men, with that universal leveller of all rights and all wrongs to them in that lonely wilderness, the rope—declaring that should Mary Crawford die, McDowell should pay the price of his butchery with his own life. Nevertheless, this man of genius, with his foresight of inspiration, planned and deliberately first opened the first abdomen for the removal of an ovarian tumor.

The world knows the rest. How Mary Crawford, tied to the rude operating table, without the aid of an anesthetic, withstood the inconceivable agony of an abdominal section; how McDowell, with a boldness and a precision akin to inspiration, removed the tumor, ligating its pedicle with tape, and came near anticipating the technic of to-day; but his scissors stopped short of cutting the tape and dropping it back into the abdominal cavity. In later years, had McDowell's technic been more fully studied, the clamp devised by the ingenuity of one "across the water" would never have been heard of, and the technic of ovariectomy perfected fifty years before it was. His patient recovered within the prescribed time of to-day and lived for many years afterward, a monument to the boldness, courage and genius of McDowell. Great operator, gentlemen, we hail him as the father of abdominal surgery.

A case that stands on record as one of the most remarkable ever

performed, was that of Dr. John King, of South Carolina, who cut through the vagina, and removed through the incision a living child that had been carried to full term in the abdominal cavity outside of the uterus. This was in 1816.

Would you know the isolation, the loneliness, the solitude, the lack of intercommunication of those pioneers of a century ago? Then realize for a moment that Nathan Smith, of Yale, performed his first ovariectomy in 1821, being entirely unaware of McDowell's great work of a dozen years before.

Hugh Hodge, of Philadelphia, took the view that enlargement, dislocation, congestion, hypersecretion and tenderness of the uterus should not be considered inflammation, but by supporting the uterus all those conditions would gradually be relieved and finally disappear. And so in 1830 he gave to us and the world his pessary, based on far more correct principles than were those of any other former ones, and in its practical application a decided improvement over any or all of them.

While up to this time all work had been done largely in private practice, we can readily see that if advancement was to be made, if progress was to be achieved, work must of necessity be done on a larger scale and deductions worked up from a much larger basis. This could be done only by the establishment of a free clinic, and this honor belongs to Dr. G. S. Bedford, of New York, and it was connected with the University Medical College in 1841.

The year 1844-45 will ever be remembered as one of the epoch years in American gynecology. Washington Atlee, working in the Lancaster County Hospital, Penn., performed two successful ovariectomies and thus established beyond controversy the legitimacy of the operation at a time when it was denounced by the profession.

It was during the same years that Marion Sims devised the wire suture and discovered a successful method of treating vesicovaginal fistula. The cause, a sudden death in childbed, baffled the entire profession up to 1852, when James A. Meigs, of Philadelphia, found its cause to be cardiac thrombosis.

The first hysterectomy for fibroid tumor was performed in Lowell, Mass., by Dr. Gilman Kimball, with a successful result. He must be credited not only with the performance of the operation, but also with the conception of the procedure.

In considering Atlee's work, we should not fail to take into consideration his method of operating on uterine fibroids, which was one of great boldness, and accompanied with unprecedented success. His method of diagnosing obscure cases of abdominal dropsy by

tapping should not be forgotten, for he was one of the first to point out that the removal of fluid was of great value in making a differential diagnosis of broad ligament cysts and fibrocystic tumors of the uterus from ovarian tumors.

Nor should we forget that great and grand man, Edmund Peaslee, who was for a generation the inspiration and ideal of a host of young men, for it was he who first, in 1854, used the drainage tube in cases of ovariectomy, followed by septicemia, through which the sac was freely washed out.

The year 1855 must ever be the memorial year in American gynecology. In South Carolina, on the 25th of January, 1813, there opened its eyes for the first time, a child that in the course of years was destined to exert a great and lasting influence upon medicine and surgery, not only in his native land, but through the entire world, and for all time—Marion Sims. He began the practice of his profession in Montgomery, Alabama. He soon became widely known for his successful operations for clubfoot. In 1845, after a long series of experiments, he made known his hypothesis on the cause and effective treatment of *trismus nascentium*. It was during the same year that he began the systematic study and experimentation in the treatment of vesicovaginal fistula, during which time he invented the duckbill speculum. The coming of this speculum cannot be overestimated. It not only placed all gynecological work upon a different basis, but made the development of all plastic work possible. And while we are among those who depreciate and deplore the naming of instruments and operations after men's names, yet in our heart we are glad that whether it be in New York, London, Paris, Berlin or Vienna, this speculum is known after the name of the American Sims. In 1853 he removed to New York.

Whatever one's talents may be, if he would strike out from the old beaten paths of the *then* accepted ideas; if he would make any impression upon the adamant age in which he lives; if he would attempt to tear down the false but highly honored structures reared by former ages, and unquestionably accepted by the authorities; if he would throw in deep through the accumulated crust of ages the pick-axe of investigation, and with the laborer's spade remove false ideas, based upon erroneous conceptions, would he do all this and expect to receive a respectful hearing even from the few he must needs address himself to a large audience, if perchance the few may be among them. Sims fully realized this, hence his removal from the scenes of his early life and labors to the larger field of life and labor, New York.

After repeated efforts, Sims succeeded in so far arousing the medical profession, through the influence of Dr. Valentine Mott, the great surgeon, and Dr. Francis, a prominent professor of internal medicine, that a meeting was called in May, 1854. The object of the meeting was to introduce Sims, who was to demonstrate a new method of curing vesicovaginal fistula. Perhaps the success of the effort was due more largely to the young president of the New York County Society, whom some of us have had the pleasure to meet and know in his declining years as Fordyce Barker. The idea of the establishment of a hospital for the treatment of diseases of women, appears to have been pretty thoroughly gone over in advance of the meeting. An idea, however, may be gained of the conception of what constituted the sum total of the proper equipment of an up-to-date gynecologist from the remarks of one, Dr. Reese, who was present at the meeting. Said he, "the field is too small for a special hospital. Anyone can apply nitrate of silver to an old ulceration through an old cylindrical speculum; and all that is needed to cure leukorrhea is an astringent injection. There is no difficulty in introducing Physic's globe-pessary for prolapsus." And so to his mind, as to many another since his day, diseases of women were something of small concern and might very properly be relegated to mesmerists of his day, as they might to the so-called Christian scientists of our own time. The meeting, however, was a great success in point of enthusiasm, and the Woman's Hospital came into existence. We must not lose sight of the fact, however, that the prime object in establishing the hospital was that Sims might have a place to demonstrate his work upon vesicovaginal fistula, for from what we have been able to learn, there was more need of the hospital for the treatment of vesicovaginal fistula, than for the special treatment of all other diseases of women. Thanks then to the surgical ability and technic of Sims, which made it absolutely necessary that the Woman's Hospital should be called into being. He has been styled by many the founder of our American gynecology, but he was more than that; he laid down broad principles and brought to his work that nimbleness of dexterity which won for the specialty an enthusiastic reception, which resulted in bringing to him a galaxy of young men that were destined to work out, elaborate and discover principles of surgical technic, and unravel mysteries of pathology that were to astonish the medical world, and bring lasting joy and happiness to suffering humanity.

It was but a year after the establishment of the Woman's Hospital that James White, of Buffalo, demonstrated a case of successful re-

duction of an inverted uterus of eight days duration. He maintained that chronic inversion of the uterus is generally reducible. He was the first operator in America who had successfully reduced a chronic inverted uterus.

Vaginismus was an affection known and treated with very scant success, until Sims in 1861 removed the remains of the hymen and a section of the tissue at the perineal extremity of the ostium vaginæ.

John Byrne and Fordyce Barker called the attention of the profession, in papers written in 1862, to pelvic hematocele. The real importance of their papers cannot be easily overestimated, for up to the time their papers were published, but one case had been recorded.

It was our own beloved Parvin who, in 1867, operated upon a case of uterovaginal fistula, by turning the displaced distal extremity of the ureter into the bladder, and then closing the vaginal opening. The procedure had been entirely worked out by himself, and was a decided success. It was in the same year that Newman, of New York, reported such important results, especially in extrauterine pregnancy, with electrolytic treatment.

The name of Thomas Addis Emmett will ever shine with a brightness that will become more and more resplendent with the passing of years. Any historical reference to our American gynecology, however brief or superficial, without making mention of him and his work, would be like the play of Hamlet with Hamlet left out.

Sims was a Southerner, and at the outbreak of the Civil War expressed sympathy for his countrymen in the south. This brought down a cloud of opposition. Sims hurriedly resigned. Dr. Emmett was the only man in this country who had either the knowledge or interest in gynecology, and he was the only one that had the capacity of carrying on the work of the Woman's Hospital. For ten years after Sim's departure Emmett was the only attending surgeon at the Woman's Hospital, as he was the only exclusive specialist in this country, and it was the only special hospital in the world for diseases of women. It was during these years that men flocked to his clinics from all parts of the world, to obtain something of his knowledge of this hitherto unknown specialty.

It was Emmett who gave us the plastic operations for the cure of lacerated cervix, for rectocele, for cystocele, for rectovaginal fistula, for laceration and prolapse of the urethra. It was he who first performed those plastic operations of marvelous mechanical ingenuity and patience of restoring the whole vagina, together with the base of the bladder and the urethra after they had sloughed away, and giving the patient retentive power.

He invented well-nigh all the instruments used in plastic work. In 1900, he resigned, after forty-six years of continuous service, and to-day he sits in the gathering twilight of a long life spent in the interest of humanity, awaiting the approach of the "silent boatman" to be borne away across the bosom of that still, calm ocean we call death, to realms of eternal youth and happiness.

The year 1870 was one of more than ordinary interest to the gynecological world. It was then that Dr. N. E. Noeggerath demonstrated the incurability of latent gonorrhea and its wide-spread existence. It was he who first pointed out to the profession the frequency of pelvic inflammation among women from sexual intercourse, if the male had ever contracted gonorrhea. He also performed reduction of an inverted uterus by digital compression of both horns. He was also one of the three gynecologists of this country that called the attention of the profession to the importance of hematocele.

It was Dr. Lente, of New York, who devised the silver probe with the platinum cusp in order to apply fusible substances to the uterine cavity. The method in its day was a decided improvement over all others, but happily, the day of caustics in gynecology has forever gone.

Dr. Jackson will ever be remembered as the founder of the Woman's Hospital of Chicago. It was in the same year, 1871, that there were thirteen medical colleges that had full professors of gynecology.

The name of Robert Batty will always be associated with the extirpation of the ovaries for the relief of dysmenorrhea, due to imperfect ovulation; the object being to bring about at once the change of life, and in this way cure the disease by eliminating a function. As we sit and calmly view his work in the light of modern gynecology, after a lapse of more than forty years, we must render a verdict against it, as being based upon erroneous principles and resulting in disastrous culminations.

It is now more than forty years ago since Dr. John Ball, of Brooklyn, N. Y., demonstrated the successful treatment of constriction and other irregularities of the cervical canal by quick and rapid dilation of the same by expanding instruments of steel. He used a three-bladed self-retaining pessary in the after-treatment. In this we shall easily see how nearly he anticipated Carstens in the use of the stem pessary.

The extensive use of *viburnum prunifolium* in the treatment of uterine disease, characterized by loss of blood, was due in a great measure to Dr. Edward Jenks, of Detroit. He was also one of the

main promoters in the organization of the American Gynecological Society, an organization that has done so much for the promotion and development of this specialty.

The first gynecological society in America was organized in Boston in 1869.

George Engelmann, of Boston, was the first to call attention to a collection of facts concerning hysteroneurosis, which showed that neurosis of the brain, pharynx, larynx, eye, stomach, intestines, bronchi and joints of a severe and misleading character, are very frequently produced by nondevelopment or disease of the uterus or ovaries, or both. His contributions along this line are well worth one's time and study to-day, though they first came before the profession in 1877.

Marcy first used the continuous animal suture and gave to us the tendon suture. Then an array of illustrious names that will be forever associated with the history and development of gynecology; Van de Walke, Baker, Warren, Fenger, Mann, Brown, Munde, Thomas, Coe, Goodell, Ashby, Ethridge, Pryor and Garrigues.

Herrick, of Michigan, performed the first operation for the cure of retroversion.

Sutton, of Pittsburgh, performed the first successful laparotomy for pelvic abscess in this country, while Dr. Charles K. Bridden was the first to perform laparotomy after the rupture of the fetal sac in tubal pregnancy. During the last ten years while the world has been constantly advancing and working out theories, the American gynecologist has been alert and ever forcing to the front. There is scarcely a single operation that was originally devised in Europe, that has not been improved or simplified at the hands of the American gynecologists, and when the time shall come to rear the tall marble shaft, which shall commemorate to the world for all time, the relief brought to womanhood by human thought and human ingenuity, bright upon that towering column, shining in the sunlight of a grateful motherhood and sisterhood, will be seen two words standing out in letters of living light, "*American Gynecology.*"

THE MECHANISM OF LABOR FROM THE STANDPOINT
OF COMPARATIVE ANATOMY, WITH A REPORT OF
CASES OF DYSTOCIA IN WILD ANIMALS.*

BY

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(With 15 illustrations.)

A STUDY of the phenomena of parturition in the various mammalian species, both from the physiologic and from the pathologic side, and a comparison of these phenomena with those occurring in the human female, brings out many suggestive analogies as well as striking points of difference in the processes involved.

The attention of the writer has been drawn to this matter by a series of obstetric accidents and complications occurring at the Philadelphia Zoological Garden, and it is due to the courtesy of Dr. Herbert Fox, pathologist to the Zoological Society that the clinical and pathological records of these cases are here reported.

In a general way it may be said that pregnancy and labor in the lower animals are governed by the same general laws that apply in the case of man. The duration of gestation, while varying within wide limits, in different species, is always constant for each species. The unknown factors that bring about labor at the time of maturity of the fetus act in a similar manner in all animals.

A comparative study of the mechanism of labor naturally begins with the anatomy of the pelvis.

Comparative Anatomy of the Pelvis.—The pelvic girdle varies more or less in each of the great mammalian orders and indeed, different species of the same order may present curious differences in their pelvic morphology.

It is not within the province of this short outline to describe in detail all of the forms of the pelvis and but a few representative types will be considered. For this purpose the marsupial and man at opposite ends of the chain of mammalian evolution have been chosen, with the important intermediate orders of the feræ, the ungulates and the higher monkeys. The quadruped pelvis while differing in greater or less degree in the different species presents certain funda-

* Read before the Philadelphia Obstetrical Society, November, 1913.

mental points of variation from the human structure. (For purposes of comparison the pelves will be studied in the same relative position as in man; as though the animal were standing erect upon the hinder limbs.)

The pelvis in the lower orders is of much greater length from the crests of the ilia to the tuberosities of the ischia than in man. The ilia rather than forming a large, concave basin-like enclosure, are narrow, wing shaped and enclose a cavity with almost parallel side walls. In man the highest portions of the ilia lie but slightly above the level of the first sacral vertebra but in quadrupeds the iliac crests rise above the sacrum for variable distances, in different species from



FIG. 1.—Pelvis of the red kangaroo (*Macropus ruber*).

one-fourth to one-half the entire length of the ilia. The symphysis pubis, in man a narrow synchondrosis, of a few centimeters in length, is in the lower animals a joint of usually about one-half the entire pelvic length. For example, the symphysis of the lioness measures 14 cm. while the total pelvic length from the crests of the ilia to the ischiac tuberosities is 34 cm. In the deer (*Rusa aristotelis*) the symphysis measures 13 cm. the entire pelvic length being 32 cm. In the red kangaroo (*Macropus ruber*) the symphysis measures 12 cm., the entire pelvis 26 cm.

As the higher zoological types are approached the symphysis be-

comes rapidly shorter. In ceropithicus, a fairly high monkey, the extreme length of the pelvis is 14 cm. that of the symphysis 3.5 cm.

In the highest of all the anthropoid apes, the gorilla, the pelvic length is 31 cm., the symphysis 5 cm. a ratio corresponding closely to the human type.

The false pelvis in quadrupeds, consists only of a small area of the narrow ilia which flare widely apart above the sacrum. Almost all of the pelvic girdle may be said to be included in the true pelvis.

The increased length of the symphysis naturally causes a wide variation between the true and the diagonal conjugate diameter.

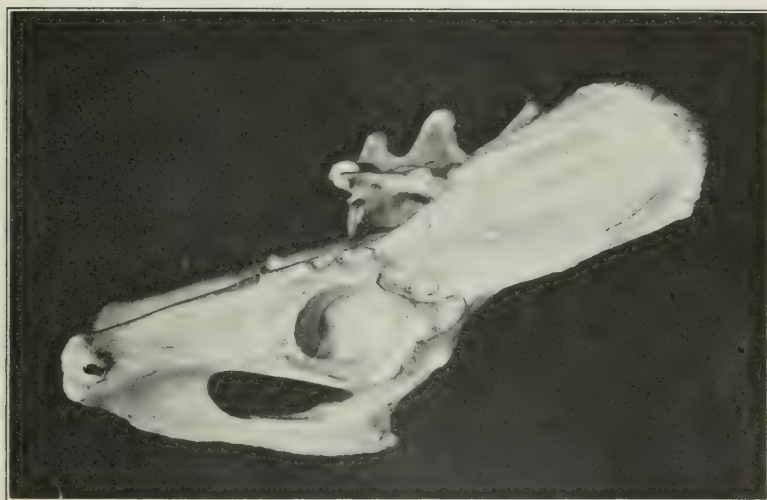


FIG. 2.—Pelvis of the lioness (*Felis leo*).

Whereas in man the true conjugate averages 11 cm. and the diagonal conjugate 12.75 cm. a ratio of about 110 to 128; in the lioness the true conjugate is 11 cm., the diagonal 22 cm., a ratio of 1 to 2. In the deer the proportion is as 14 to 26, in the great kangaroo 10 to 19 in the ceropithicus 7 to 10 and in the gorilla it is as 18 to 22.

It will be seen that in the passage of the fetus under the promontory of the sacrum, it meets with no bony obstacle below, since the entire promontory lies anterior to the symphysis and has only soft tissues opposite it. The pelvic contraction ring begins only when the fetus has passed over the symphysis and becomes enclosed within the lateral bony walls. For these reasons the true conjugate is in no sense a measure of the pelvic size, since the difficulty in passage lies in the vertical dorsoventral diameter (Fig. 6). The form of the

pelvic inlet is only of importance so far as it concerns the vertical diameter.

It follows that in quadrupeds the possible rotation of the sacrum on its sacroiliac joint, is of the greatest value both in increasing the vertical diameter and by widening the pelvis by a separation of the ilia. This movement of the sacroiliac joint varies greatly among different species and is most marked in young animals during their first delivery. Later in life the joint becomes ankylosed. The shape of the pelvic brim varies exceedingly among the orders and



FIG. 3.—Pelvis of the deer (*Ruso aristotelis*).

species. In the lower forms as the kangaroo, it is of the shape of a narrow triangle, the triangular form becomes more and more widened as higher animals are reached, until, the sides becoming more and more concave, the brim becomes ovoid in the ungulates, the broader portion being above.

In all quadrupeds the antero-posterior (dorsoventral) diameter is longer than the lateral one. The size of the pelvic cavity varies not so much with the relative sizes of the particular animals, as with the number and form of the young. It is obvious that in uniparous animals as the mare, cow, etc., where one or at most twin fetuses are produced at a birth a larger birth canal is required, than in multiparous animals as the dog or swine, where the young are multiple and naturally of relatively smaller size.

The salient points of difference between the quadruped pelvis and

the biped, human type may be epitomized as follows: (a) The entire pelvis lies (with the animal in its normal station) in a generally horizontal position with a slight slope downward anteriorly. (b) The false pelvis is almost entirely wanting, there being practically no bony structures above the brim with the exception of the small upper portions of the ilia. (c) The pelvis in quadrupeds is never basin shaped, the lateral walls from the iliac crests to the tuberosities of the ischia lying roughly parallel to each other and enclosing a pelvic cavity rectangular in outline. Only in the highest apes (Fig. 5) does the basin-shaped pelvis appear. (d) The angle of the



FIG. 4.—Pelvis of the monkey *Cercopithecus* (right). Osteomalacic pelvis of the Barbary ape, *Macacus inuus* (left).

axis from the promontory of the sacrum to the symphysis is always greater in quadrupeds than in man, averaging in the former from 70 to 80 degrees, in the latter about 55 degrees. (e) The symphysis pubis is an extremely long joint, being frequently greater than half the length of the entire pelvis. (f) The sacroiliac joint is more or less movable in all quadrupeds, especially in younger animals. The rotation of the sacrum on the ilia increases the antero-posterior (dorsoventral) diameter of the outlet and at the same time wedges apart the ilia, thus increasing the lateral diameter.

Before dismissing the subject of pelvic anatomy it is interesting

to speculate upon the effect of the gradual assumption of the upright position on the part of man, upon the morphology of the pelvic girdle. For example, could one imagine a lioness suddenly deeming it good form and enjoyable to go about constantly on her hind legs, and being given the power to transmit that gait and station to innumerable succeeding generations of lions, it is apparent that certain changes in the architecture of the pelvis would gradually supervene (Fig. 2).



FIG. 5.—Pelvis of the gorilla.

The weight of the trunk above causing a thrust of the sacrum downward and backward would cause a gradual change in the center of gravity, tending to force the acetabula forward and the spinal column backward. The trunk weight would also produce a dropping or pushing backward of the bodies of the ilia, increasing the angle of this portion of the bone. The sacrum would rotate on its axis throwing the promontory forward and the coccyx backward. The upward push of the legs upon the acetabula, together with the pull of the great muscles of the back, would force the symphysis forward and upward, decreasing the angle of the superior strait. The pressure downward of the abdominal viscera would naturally re-

quire more bony support with a resulting growth of the wings of the ilia forward, their cavity becoming concave.

With these mechanical forces operating during countless generations it becomes readily apparent that the resultant pelvis would of necessity be a basin-shaped cavity, with broad, expanded iliac bodies, a short symphysis, the acetabula well forward of the axis of the

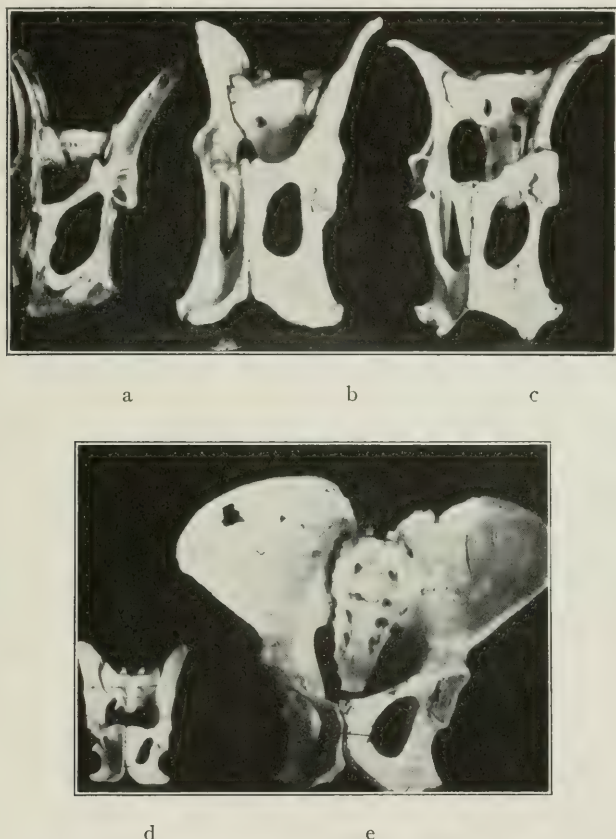


FIG. 6.—The evolution of the pelvis. a. Marsupial. b. Carnivor. c. Ungulate. d. Quadrumane. e. Primate.

sacrum, which bone would have its promontory sharply directed forward. In other words a pelvis of the human type.

The soft tissues of the pelvis vary greatly among animals. Usually there is found a broad fascioligamentous band extending from the sides of the sacrum to the tuberosities of the ischia. This ligament sacrospinous et tuberosum closes the lateral walls of the pelvis

and is strong and dense in consistency though becoming softened and elastic during pregnancy. The rectum lies dorsally just under the vertebræ, the bladder below and resting on the symphysis. The pelvic fascia extends in long lateral planes along the pelvic walls. The levatores ani occupy much the same relative position as in man, extending from the spines of the ischia across the floor of the pelvis.

Having a general idea of the anatomy of the quadruped pelvis, it becomes possible to consider the mechanism of labor in these animals,

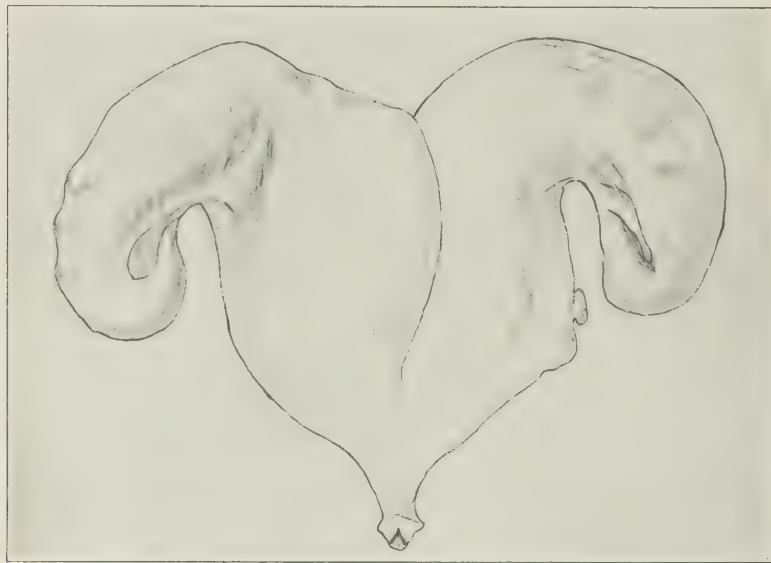


FIG. 7.—Pregnant uterus of the sheep, right horn gravid.—(*Harms.*)

but before proceeding with this phase of the subject it is well to briefly review the main facts concerned with reproduction in the lower mammalian forms. In all mammals except man and the higher apes the uterus is double; bicornuate in most of the orders and frankly duplex in some of the lower forms. In those varieties bearing but one fetus at a birth, one or the other uterine horn is the seat of the pregnancy while in the multiparous species both horns become gravid.

Where but one ovum is fertilized, the pregnancy usually occurs in the uterine horn of the same side as the ovary from which that particular ovum is derived. The opposite horn may, however, be the seat of the conception, either by a process known as external wandering, in which the ovum is carried from its parent ovary across the

abdominal cavity and into the tube on the opposite side, or the transition may take place by internal wandering which occurs when the ovum is impregnated upon one side and later passes out of its own uterine horn, into the body of the uterus and finally lodges in the cornua of the other side.

Position of the Fetus.—In multiparous animals the fetuses lie indifferently, in head or breech presentations, usually alternating in position. In unipara the fetal head presents at the cervix in about 90 to 95 per cent. of the cases. The reason for this presentation is interesting in comparison with the same phenomenon in man. In

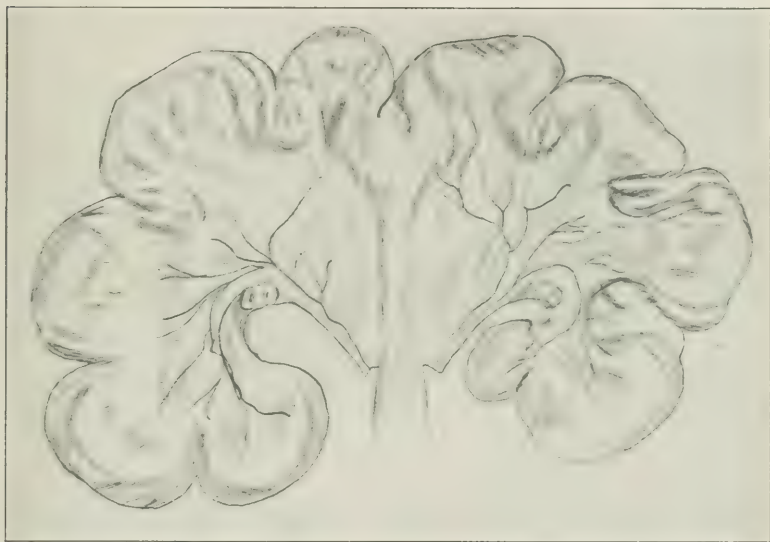


FIG. 8.—Pregnant uterus of the sow.—(Harms.)

the latter the fetal head, being its heaviest portion, naturally gravitates into the most dependant position in the uterus, *i.e.*, the lower uterine segment with the resulting normal cephalic presentation. In quadrupeds the hind quarters and trunk of the fetus are its heaviest parts which gravitate into the lowest portion of the uterus, but as the uterus itself lies with its cornua low in the abdominal cavity, the cervix rising to meet the pelvic inlet, the heavier breech occupies the upper uterine segment while the lighter head presents, impinging upon the cervix (Fig. 10).

The Mechanism of Labor.—The termination of pregnancy in quadrupeds is marked by a distinct sinking in of the flanks as the uterus

descends to its lowest position in the abdomen, and a rotation of the sacrum upon the axis of its sacroiliac articulation produces a concavity of the lumbar spine. Labor begins with a more or less profuse vaginal secretion of mucus, and the gradual onset of rhythmic uterine contractions. These contractions together with those of the abdominal muscles lead to active labor which is divided into four stages: 1. The movement of the fetus into its final presentation. 2. Dilatation of the cervix uteri. 3. The rupture of the membranes. 4. The expulsion of the fetus.

Clinically labor is divided into but two stages, that of dilatation and that of expulsion. (The active agents in the onset of labor are

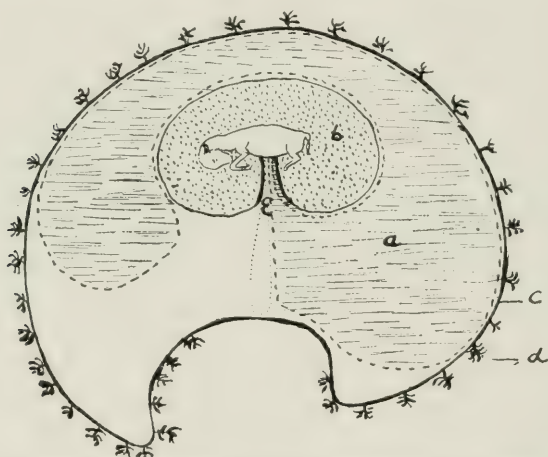


FIG. 9.—Schematic representation of the fetal membranes in the mare.—(Harms.)
a. Allantois. b. Amnion. c. Chorion. d. Villi. e. Umbilical cord.

identical in all mammals, consisting of the uterine tonicity, the intermittent uterine contractions and the voluntary contraction of the abdominal muscles, opposed by the passive resistance of the bony pelvis and the elasticity of the muscles of the pelvic floor).

The mechanism of expulsion in quadrupeds differs greatly from the same process in man, both by reason of the entirely different position of the uterus in the pelvis and also on account of the very different relative size of the fetal head. In the upright human being the uterus lies directly above the pelvic cavity, the cervix directed immediately into it. Labor causes the largest fetal part, the head to impinge directly upon the cervix and the pelvic basin. With the mother in the recumbent position the fetus leaves the uterus to enter

the pelvic outlet in a practically straight line and has no distinct rise to overcome before becoming engaged.

Among quadrupeds the situation is very different. The uterus hangs deep in the abdomen in front of the high symphysis pubis, to exert pressure upon the cervix the fetus must not descend but must rise at an angle of about 45 degrees surmounting the sharp edge of the symphysis before the pelvic inlet is reached. Should the mother animal assume a recumbent position, lying upon her abdomen the fundus uteri is lifted somewhat, decreasing the angle in which the uterus must ascend, but when the pelvic inlet is reached the symphysis and the rami of the pubes form an obstacle to the path of the fetus which must rise over the abrupt declivity made by these bony structures. In both breech and head presentations the nor-

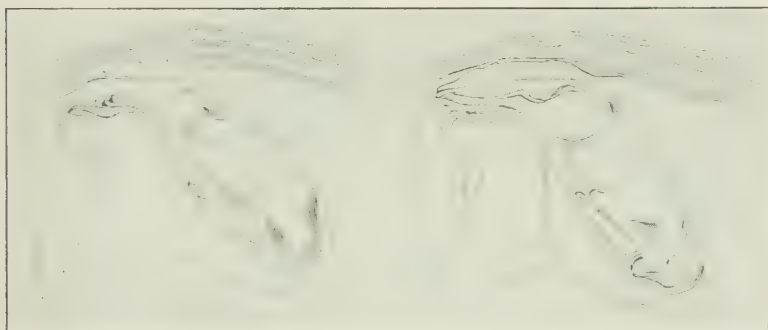


FIG. 10.—Normal anterior and normal breech presentation in the cow.—
(Harms.)

mal position is for the abdomen of the fetus to lie ventrally, in relation to the abdominal surface of the mother. During pregnancy the fetus usually lies on its side or back with the legs closely folded under the abdomen, but in the rotation accompanying the first stage of labor it assumes the dorsoventral position. (*Note*.—In multiparous animals as the dog, swine, etc., the young are usually extruded alternately from first one and then the other uterine horn and the presentation also usually alternates, first a head, than a breech and so on.) At the onset of labor the rhythmic uterine contractions grow more and more pronounced. As in man, the upper uterine segment consisting of the fundus and the cornua form the contractile portion, while the cervix and vagina remain passive, yielding gradually and dilating as the fetal presenting part is forced through them. In uniparous animals the unimpregnated horn of the uterus must con-

tract synchronously with the gravid one since if this were not the case, the soft, empty horn would form a locus resistens minoris, and the presenting part might easily be forced into this dilatable portion of the uterus rather than through the strongly resisting cervix.

The rotation of the fetus next occurs. This is a process of considerable rapidity and consists, not in a rotation of the presenting

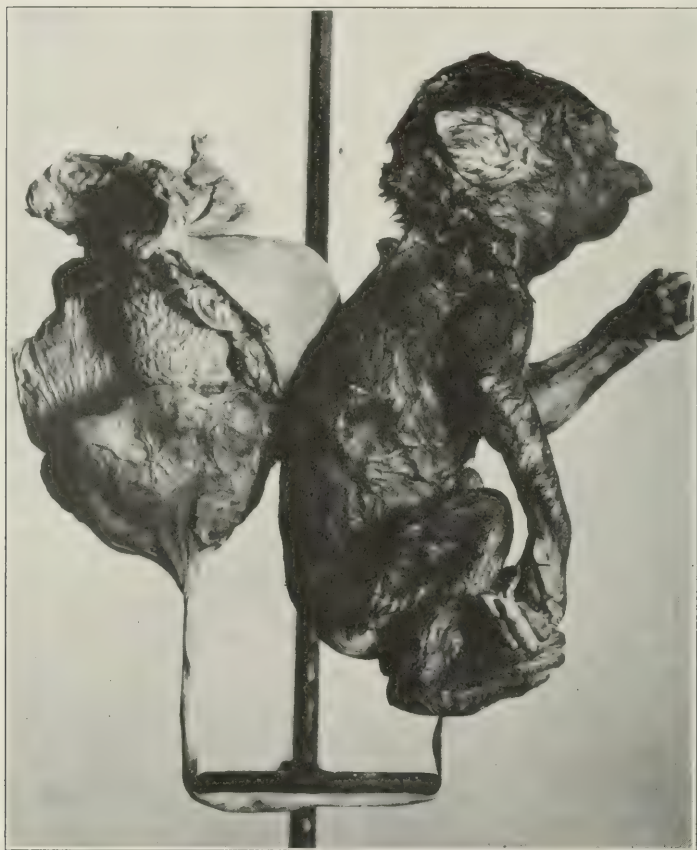


FIG. 11.—Fetus of the Barbary ape (*Macacus inuus*) with uterus and placenta. Compare Fig. 4.

part upon the pelvic floor as in man, nor do the pelvic walls play an important rôle in this phenomenon. It is rather an accommodation of the greatest diameter of the fetal body in cross-section to the greater axis of the mother, that is the dorsoventral. The extension of the legs also occurs during the first stage of labor. In the course

of its development the fetus assumes the usual elliptical form but when the intermittent uterine contractions begin to force the fetus upward and forward over the pelvic rim, the legs being freely movable are acted upon first and by a sort of peristaltic motion are gradually extended past the thorax and head until they are fully extended. By the same action the hind legs are tucked closely under the fetal abdomen to be extended only after the fore part of the young animal has been delivered.

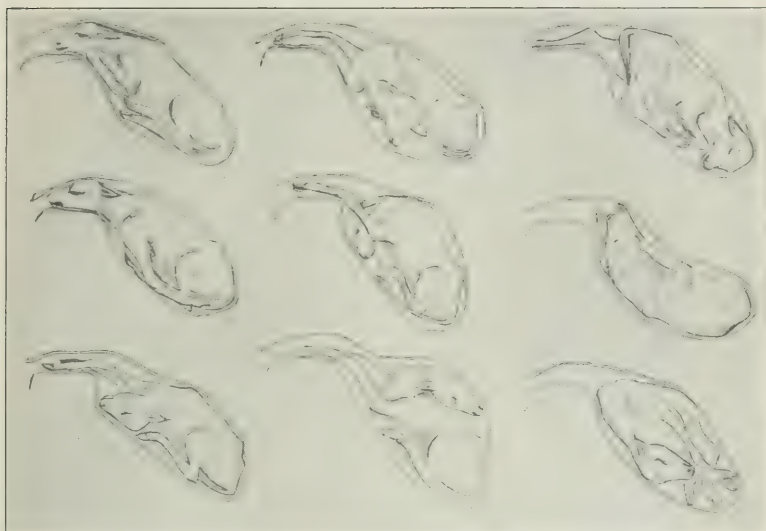


FIG. 12.—Abnormal presentations in the cow.—(*Harms.*)

1. Fore leg flexed at hock. 2. Fore legs flexed at shoulder. 3. Lateral deviation of head and neck. 4. Lateral deviation and flexion of neck. 5. Excessive flexion of neck. 6. Hyperextension of neck. 7. Flexion of one hind leg. 8. Lateral presentation. 9. Transverse presentation, back presenting.

The fetus is now presenting at the closed cervix, the head extended and lying between the fore legs which are in full extension, the long axis of the fetus parallel to the long axis of the mother, the hind legs flexed under the abdomen (Figs. 10 and 11). The uterine contractions continuing, the fetus is forced into the pelvis. It is believed that the cervix does not dilate until it and the fetus have entered the inlet. The cervix then slowly dilates, the wedge of membranes acting in the same hydrostatic capacity as in the human being. With full dilatation rupture of the membranes occurs. There may be two distinct flows of fluid from the membranes, since in quadrupeds the fetus is enclosed within two distinct sacs, the amnion surrounding the fetus

itself and the allantois enveloping both (Fig. 9). Separate rupture of these two membranes may naturally occur.

The course of the fetus through the pelvis is as follows: the sacral promontory is passed without difficulty since there is no bony ob-



FIG. 13.—Complete inversion of the uterus in a mouse. a. Inverted and prolapsed uterus.

struction on the opposite ventral surface and as may be seen in Fig. 10 the promontory is only opposed by the maternal soft tissues and the abdominal muscles. The first critical point in the traverse of the pelvis is reached when the presenting part must rise over the

sharp ridge of the symphysis pubis. This obstruction passed the young animal enters the mid-pelvis, encompassed by the pubes below, the ischia and ilia laterally and the somewhat movable sacrum with the root of the tail above. When this strait is passed the critical period is over, the fetus now entering the outlet where the tuberosities of the ischia, flaring apart, form the lateral walls, the ascending rami of the pubes and ischia, the floor and the freely movable tail, the roof. The perineum now dilates and the fore limbs and head are born, rapidly followed by the trunk and hind legs. The phenomenon of external rotation does not occur as the fetal body has occupied its final presentation from the beginning of labor.

A variable time after the delivery of the fetus, the membranes are extruded, their amount and form varying greatly in different orders, and labor is complete.

The Pathology of Labor.—In the study of dystocia from the comparative standpoint, the arrangement and classification of Hirst has been followed wherever possible. This very large portion of the subject must be presented in but a brief outline owing to the limitations of this paper. It is one of the most engrossing phases of the comparative study of reproduction and is deserving of much closer attention on the part of the obstetric profession that it has hitherto been accorded.

1. *Anomalies in the Forces of Labor.*—Deficient power of the uterine muscle, inertia uteri. This condition may be due to a simple lack of tonicity in the uterine muscle or to some pathological condition of the embryo, as twin pregnancy, hydrocephalus or any similar condition. It may be due to deficient mobility of the uterus as following an exudative pelvic peritonitis, or it may be paralytic in type, following the ingestion of certain poisons.

The symptoms are slow and indefinite labor, with sometimes entire cessation of contractions. If the fetus is not delivered by artificial means, the inertia may continue with death and decomposition of the fetus and peritonitis in the mother. The condition is not uncommon in domestic animals, though none appear to be recorded as observed among wild beasts.

2. *Excessive Power in the Expulsive Forces of Labor.*—As in man this anomaly is rare in the lower animals though there sometimes occurs a condition of rapidly recurring, powerful uterine contractions culminating in a tetanic spasm of the organ. The result of such overcontraction is a precipitate labor if the pregnancy be at term, but if the accident takes place before the fetus has assumed its po-

sition of final presentation, there may result an abnormal position with impossible delivery and rupture of the uterus as a result.

3. *Excess of the Resistant Forces of Labor.*—Deformity of the pelvis. Imperfect development of the pelvis is one of if not the most common cause of dystocia in human beings. Among animals this condition plays but an unimportant rôle, and when pelvic deformity is present it is due, not often to maldevelopment but to the morbidity of disease affecting the osseous system or as a result of the imperfect union of fractures.

The generally contracted pelvis does occur, however, but statistics as to its frequency are wanting, by reason of the obvious lack of data as to pelvic measurements among the lower animals. Furthermore, in domesticated beasts, at least there is frequently a marked disproportion in size between the male and female which have been bred together (as the mating of a percheron stallion with a mustang mare, for example) so that veterinarians recognize a condition termed a relatively too small pelvis, or one which is normal for the animal in which it occurs but is too small to permit the passage of a fetus gotten by a much larger sire.

The juvenile pelvis of young animals at their first birth is sometimes an obstacle to the passage of the fetus by reason of its incomplete growth. Here, however, the bony structure is so unformed and the joints and epiphyses so movable that the lack of size is compensated for by the increased elasticity. While developmental malformations are rare, there has been described a form called the oblique pelvis in which the axis is turned to one side or the other. Several specimens of this deformity are on record.

Also rare is the condition known as the bridged pelvis wherein a distinct bony septum which spans the inlet just above the symphysis, acts as an insuperable obstacle to parturition. Exostoses of various forms and sizes have been noted and may occur at any portion of the pelvis, but are especially notable about the symphysis and the sacroiliac joint.

Deformities due to imperfect union following fracture and to excessive callus formation are common, indeed the most frequent cause of pelvic dystocia may be traced to some previous bone injury. Second only to fracture in the production of obstructions to labor, are deformity following diseases of the osseous system especially rachitis and osteomalacia.

A most interesting case of this type recently occurred at the Philadelphia Zoological Garden and came under the observation of Dr. Fox, to whom the writer is indebted for the report. A Barbary ape

(*macacus inuus*) No. 1958, which had been in the collection for two years and was apparently in good health, was discovered in labor. No progress being made and the animal becoming shocked, Dr. Fox made an ineffectual attempt to deliver by version, the monkey dying during the operation. Upon autopsy the uterus contained a fetus apparently at term. The head was extended so that the face presented, but the head was not engaged. The cervix was fully dilated but the uterine muscle was relaxed and flaccid. The fetus was dead when the animal was first examined. The uterus contained two placentæ as is normal for these apes, the left placenta being the place of attachment of the fetus while the right one was somewhat smaller and presented no umbilical cord. The fetus (Fig. 12) was normal in size and form, the face was extended and its lower portion far advanced in a caput succedaneum. The measurements of the fetal head were as follows: bitemporal 5.5 cm., biparietal 6 cm., occipitofrontal 8.5 cm., occipitofrontal 7.5 cm.

The pelvis (dried specimen) presents a most interesting condition (Fig. 4). The sacrum is bent sharply forward, carrying with it the border of the ilia, which are bent upon themselves forward and downward. The lateral walls of the pelvis are greatly narrowed, the ischia drawn inward. The pubes and the symphysis are fairly normal. The pelvic measurements are: diagonal conjugate 6 cm., true conjugate 4 cm., greatest transverse 4 cm.

It is apparent at a glance that here was an impossible labor, since the head of the fetus could not possibly enter the pelvis the size of which, *inter vitam*, must have been less than the above measurements by reason of the soft parts. This is in the experience of the writer a unique case of a complete obstetric history, plus the specimens, of labor with an osteomalacic pelvis in a wild animal.

Obstruction to Labor on the Part of the Maternal Soft Structures in the Parturient Canal.—Spasmodic contraction of the cervix, sometimes occurs and may prove a serious obstacle to delivery. Rather more common is true rigidity of the cervix, occurring in elderly primiparæ as a result of inflammatory change, infiltration of the tissues with lime salts or in the presence of malignant degeneration of the part.

Atresia of the vagina and septa of various forms are occasionally noted in the literature. Double orifices of the vagina and inflammatory bands are not uncommon in cattle. Tumors of the genital tract are frequent sources of dystocia. Carcinoma, sarcoma, fibroids and indeed all the known varieties of neoplasm encountered in women, may occur in the lower animals and may present themselves in any

segment of the birth canal. Among animals gray in color, melanotic tumors of the anus, vulva and vagina are of frequent occurrence.

Displacements of the uterus are uncommon in animals owing to the horizontal position of the trunk which results in a normal marked anteversion, the uterus resting heavily upon the abdominal muscles. The condition is pathological only when the anteversion becomes so marked that in the pregnant animal the long axis of the fetus lies at right angles to that of the mother. It results sometimes from some fault in the integrity of the abdominal muscles, together with some force behind the uterus, pushing it forward. Retroversion is obviously a very rare condition, again owing to the horizontal carriage. It plays no part in obstetric complications. Hernia of the gravid uterus is of not infrequent occurrence. An exaggerated state of the same lack of integrity of the abdominal muscles that predisposes to anteversion may lead to hernia or hysterocele which forms no serious obstacle to labor unless the hernia be irreducible, when parturition may be impossible. Torsion of the pregnant uterus is commonly met with in the lower animals, while exceedingly rare in man. The pregnant quadruped uterus becomes in effect, a large, rounded mass (the gravid horn) attached to a long, slender pedicle (the cervix and vagina). These latter organs lie in a direct horizontal position, with the uterine body hanging at an angle from them, lower in the abdomen. Furthermore the uterus lies free and movable, its suspensory ligaments being slight and inactive in so far as restraining the mobility of that organ. Torsion is, therefore, a frequent complication, the twist usually taking place at the junction of the fixed vaginal portion with the movable abdominal portion of the uterus, or the torsion may develop in the uterine cornua itself.

Serious consequences almost always follow this accident; not only is labor absolutely obstructed, but the disturbance of the blood supply in the twisted portion of the uterus causes congestion, necrosis and peritonitis.

ABNORMALITIES IN THE MECHANISM OF LABOR.

Malposition of the Fetus.—Abnormal presentations occur with considerable regularity among animals, though obviously no satisfactory statistics are available. Among the large domestic creatures these malpresentations are carefully classified and are diagnosed and treated by the veterinarian by methods similar to those common in human obstetrics.

The reasons underlying faulty position of the fetus are directly comparable with those occurring in man. The presentation develops usually during the first stage of labor and may be due to abnormalities in the character of the uterine contractions, imperfect dilatation of the cervix, premature rupture of the membranes and, of course, the death of the fetus.

Owing to the general configuration of quadrupeds in general, many varieties of malposition are possible. The presentations are grouped among veterinarians as follows, it being remembered that a breech with extended hind legs is considered normal, though much less common than the typical head presentation (Fig. 13).

TABLE OF ABNORMAL PRESENTATIONS IN THE LARGER UNIPAROUS ANIMALS.

Anterior Presentations	{	Fore limbs	{ Incompletely extended, flexor tendons shortened. Crossed over the neck. Bent back at the knee. Bent back from the shoulder. Excessive flexion, head bent downward on neck.
		Head	{ Excessive flexion of neck, head and neck bent beneath breast. Excessive extension, head on the back.
		Hind limbs	Hind feet engaged in the pelvis.
		Transverse Inverted	Back presenting. Ventral surface of fetus in relation with dorsal surface of mother.
Posterior Presentations	{	Hind limbs	{ Flexed on themselves at hock. Flexed at hip.
		Transverse	Back of fetus presenting.
		Inverted	Inverted.
		Transverse	{ Back and loins present. Thorax and abdomen present.

The study of abnormal presentations and their effect upon labor is a fascinating chapter of comparative obstetrics, but for lack of space cannot be further considered in this brief outline.

LABOR COMPLICATED BY ACCIDENTS AND DISEASES.

Hemorrhage.--Postpartum hemorrhage is occasionally noted among the lower animals, but is rarely severe and originates usually as a result of laceration of the vulva, vagina or cervix uteri. Sometimes in ungulates a cotyledon is torn off from its uterine attachment and free hemorrhage takes place from the site. True postpartum

hemorrhage from a relaxed uterine muscle may occur among the higher apes which possess the large discoid placenta very similar to the human form, but in the lower orders, where the placenta is more or less loosely attached, bleeding from its site is usually insignificant.

Placenta previa as a clinical entity, is not recorded in the literature, to the writer's knowledge. Anatomically considered, there is sometimes found in ungulates a circle of cotyledonal processes developing about the internal os. Such growth is comparable to placenta previa in man, but plays no part in the mechanism of labor.

Premature detachment of the placenta with death from concealed hemorrhage is sometimes seen in monkeys. In the records of the Zoological Garden Laboratory there is found the history of a Black Lemur (*Lemur macaco*) No. 81, which was found dead in its cage. Upon autopsy the uterus contained a small fetus with one leg and the tail protruding from the vulva. The fetus was normal in size. There was a large amount of free blood in the uterine cavity and extensive extravasation into the myometrium. The placenta was completely detached.

Rupture of the uterus is occasionally met with. The tear may be spontaneous when it is caused by the too great pressure of the uterine contractions upon an impossible presentation, or artificial when it originates as a penetrating wound due to pressure upon a sharp hoof. Hemorrhage following uterine rupture is severe though not necessarily fatal, but the prognosis is grave by reason of the septic peritonitis which is the usual sequel to the accident. The escape of the ovum into the abdomen may take place with a continuance of pregnancy of the secondary abdominal type.

Lacerated wounds of the cervix are quite frequent among those animals having sharp-hoofed young. The rupture is usually in the superior (anterior) cervical surface and may give rise to profuse hemorrhage, with complete separation of the cervix from the upper uterine segment, should labor progress through the traumatic aperture in the cervix.

Rupture of the vagina as an accident accompanying labor is fully described in works on veterinary medicine. The injury is due to the delivery of a large fetus, to the forcible expulsion of the fetus in an abnormal presentation, or to a deposit of fat masses in the pelvis, which tend to encroach upon the diameter of the vagina and present obstacles to the passage of the young. De Bruin also describes a true fat infiltration of the connective-tissue framework of this organ.

Rupture of the vagina may also accompany constitutional dis-

ease with general loss of resistance as is well illustrated by the case of a camel (*Camelus bactrianus*) No. 2551 which died of shock in labor at the Zoological Garden. Upon autopsy the animal was found to have hydatid disease of the liver, lungs and spleen, cirrhosis of the liver and nephrolithiasis. Protuding from the vulva was a portion of the fetal membranes, the whole vaginal wall and several coils of intestine which had escaped through a large rent in the posterior vaginal wall. The anterior wall was swollen and edematous, the whole region surrounded by clotted blood. The cervix was obliterated, the membranes unruptured, the fetus in the normal extended head presentation. The veil like placenta was somewhat injected but otherwise normal. There was some hemorrhage about the rectum but none in the free peritoneum. This animal had broken her hind leg just above the fetlock three weeks before falling into labor, and was unable to stand. It is evident that the difficulty of delivery associated with an unnatural and forced posture due to the fractured leg was sufficient cause for the rupture of the vagina where the tissues were degenerated as a result of the coincident general disease. Inversion of the uterus is one of the common accidents of labor among all animals, most frequently seen in ruminants.

The chief causes for the inversion are, as in man, the relaxation of the cervix, incomplete contraction of the uterus following labor, relaxation and stretching of the broad ligaments, relaxation of the pelvic muscles and fascia, and faulty posture on the part of the mother animal.

The immediate causes are aspiration of the uterus by the fetus, in a long severe labor. Where the membranes have ruptured some time before delivery, the uterus may be inverted after birth much as a tightly fitting glove, when the finger is withdrawn from it. Excessive after pains are also considered as etiological factors.

The inversion may only involve the uterine cornua which may turn into the body of the organ, or the entire uterus may be inverted with complete prolapse. Quadrupeds are peculiarly susceptible to this condition owing to the very long and generally relaxed suspensory ligaments, the length of the uterus itself and the vigor of the uterine contractions.

The last case of dystocia to be here reported is one of this accident. A Japanese Waltzing Mouse (*Mus wagnerii rotans*) No. 3024, died at the Zoo a few hours after an uneventful labor. On autopsy the entire uterus was found inverted and prolapsed, the organ the seat of a violent congestion, the animal having died of shock (Fig. 14). Many other complications and accidents of labor, of greater or less

import might be cited but enough have been described to illustrate in a general way the pathology of parturition among the lower animals.

In conclusion it may be said that in this rather cursory survey of a very large subject, it has been attempted to bring out one great fact, namely that the physiology of pregnancy and parturition, the deep biological principles underlying reproduction are in their every feature identical among all animals including man, and that the variations in mechanism and in the manner of fulfilment of these processes, though seemingly tremendous in degree, are in reality trivial differences due to greater or less variation in the architecture of the body according to the place of the animal in the scale of evolution.

348 SOUTH FIFTEENTH STREET.

REPORT OF A WELL-AUTHENTICATED CASE OF SARCOMA OF THE PLACENTA.*

BY

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(With one illustration.)

THIS rare specimen, which it is my pleasure to present, is a small cell sarcoma of the placenta. The patient from whom it was obtained was a primipara, nineteen years old, and of the better social class. The family history is not pertinent. Pregeancy was uncomplicated save for a troublesome retroversion. She was delivered by the writer April 4, 1912, two weeks before the expected time. Labor began with rupture of the membranes and terminated spontaneously in nine hours. The baby weighed 6 pounds 3 ounces. The placenta was expelled in a normal manner in about the usual time. There was no abnormal blood loss. At the time of delivery the placenta attracted no special attention. Later, however, while more carefully examining the placenta, the tumor was discovered. It was the size of a child's fist, kidney-shaped, and its color was similar to that of kidney tissue. It seemed to be encapsulated by a shiny membrane. In a casual examination the tumor could have escaped unnoticed. During the examination of the specimen which I made at once, a portion of the tumor was torn away. This and the placenta were subsequently sent to Dr. Hulst, the hospital pathologist, for diagnosis. He reported that the tumor resembled sarcoma. The specimen was

*Presented at a meeting of the New York Obstetrical Society January 13, 1914.

then sent to Dr. J. Whitridge Williams, who has made a considerable study of the pathology of the placenta and he also pronounced it a sarcoma. Dr. Wm. Welch also saw the specimen and concurred in this diagnosis. The very elaborate report which Prof. Williams kindly sent me is found in full below.

Tumors of the placenta are reported to exert a deleterious effect upon pregnancy and labor. Albert records that only one-third of the children in this series were born alive and well developed. Premature labor occurred in thirteen and in three manual extraction of the placenta was necessary. In five, unusual hemorrhage followed delivery of the placenta. Only one of these complications, premature labor, occurred in my case.

The chief interest in this specimen is its extreme rarity. In the latest review of the subject of tumors of the placenta (Kummer, 1911) only seventy-nine tumors of the placenta are reported (others have doubtless been added), and sarcoma is mentioned in only five instances. Hyrtl reported two cases but later writers state the examinations were superficial and do not believe the diagnosis to be admissible. Bode, Galabin, Dupin and Chabaud each report a case resembling sarcoma. Pitha, who in 1907 reviewed sixty-three cases from the literature, carefully analyzed these three cases and claims that the date given by the reporters would not justify the diagnosis of sarcoma. In the case here presented the patient has been under observation and has remained well. The baby has developed normally.

Dr. William's report is as follows:

The placenta which has been hardened in formalin is well preserved, but its membranes are markedly shrunken. It is 14 cm. in diameter and almost circular in shape. The area of rupture in the membranes has occurred 4 cm. from one and 20 cm. from the other margin of the placenta. The umbilical cord is inserted marginally and measures 39 cm. in length. The fetal surface of the placenta is normal except for a few white infarcts. The maternal surface is divided into numerous cotyledons and presents a normal appearance, except on the side opposite the site of insertion of the cord. In that area a large cotyledon is replaced by a flattened, oval and somewhat nodulated kidney-shaped tumor, which measures $7 \times 4 \times 2$ cm. It presents a glistening surface, almost as if covered by peritoneum, and is sharply marked off from the surrounding tissue by definitely rounded margins. Beneath the capsule numerous vessels extend over its surface. Its maternal surface is free, but about two-thirds of its fetal surface is densely attached to the underlying placental tissue.

Accompanying the specimen is another tumor of similar appearance, measuring $6.5 \times 4 \times 3$ cm. The greater part of its surface is covered by a smooth glistening capsule, which can be peeled off

without great difficulty, while the remainder presents a number of small tags of tissue, which apparently indicate its former attachment to the jagged portion of the placenta immediately adjoining the tumor just described. On section, the tumor is dense and presents a somewhat buffish appearance. On closer examination areas of light brownish tissue project slightly above the general surface

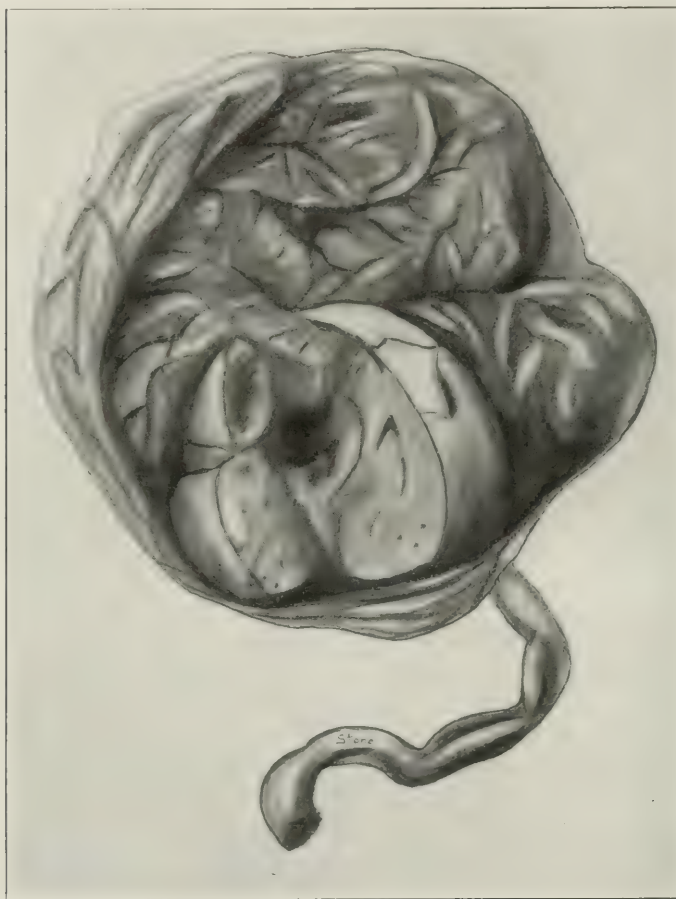


FIG. 1.—Placenta showing sarcomatous tumor.

and are separated from one another by a whitish tissue containing many blood-vessels. A section through the tumor, which is still attached to the placenta, is suggestive of the liver, and at one pole is an oval area 2×1.5 cm., which is sharply differentiated from the rest of the tumor and appears to contain large quantities of blood.

Microscopic Examination.—Sections through the portion of placenta underlying the tumor present an essentially normal

appearance, although in places there is a good deal of degeneration and infarct formation with occasional areas of calcification. At one point a number of villi are markedly enlarged and present an unusual development of venous channels, together with a considerable increase in the number of stroma cells, which may throw light upon the mode of origin of the tumor.

The tumor itself presents a varying appearance in different parts. Its free surface is covered by typical chorionic epithelium, beneath which there is a thin layer of apparently normal chorionic connective tissue. In the hemorrhagic area, described above, one gets a typical picture of chorioangioma; large numbers of blood spaces of varying size, lined by a single layer of endothelium, which are separated from one another by varying amounts of almost mucoid connective tissue, which is very poor in nuclei. Immediately adjoining this are other areas which at first glance present a mottled appearance, but closer examination shows that it is due to the development of rounded and oval cells around the periphery of the blood spaces, which appear to become smaller as the proliferation increases. In these areas the proliferated cells are separated from one another by varying amounts of connective tissue. In other places the tumor is made up of tolerably closely packed oval cells which have completely replaced the original stroma. This tissue contains numerous blood-vessels which, however, are not nearly so abundant as in other parts of the tumor.

There is no doubt that the tumor is derived from the chorion, the first stage apparently being the development of a chorioangioma. Later the cells surrounding the blood spaces have undergone proliferation, and have given rise to a tumor which can be designated only as a small cell sarcoma. The earliest stage in the process can be observed in some of the villi outside of the tumor and still within approximately normal portions of the placenta. Such villi are markedly enlarged and contain an unusual number of blood-vessels lined by a single layer of endothelium about whose periphery the stroma cells are greatly increased in number and size.

The first report of a tumor of the placenta was made by John Clark in 1798. As this was before the days of histological examination its character is not definitely known. He called it angioma. In 1898 Albert summarized thirty-six cases found in literature, and three of his own. Of the thirty-six, fourteen were myxoma fibrosum, ten fibroma, nine angioma, two sarcoma, one hyperplasia of the chorionic villi. His own cases he calls angioma fibromyxomatousum. The two cases of sarcoma he gives are as follows:

Galabin reported a placental tumor surrounded by a capsule attached to the placenta, about the size of a human heart. Microscopically the connection of the tumor with the chorion villi could be seen. Both were covered with the same epithelium. The superficial part showed fibrous connective tissue, the deeper, on the con-

trary, showed round and spindle cells. A part was composed entirely of blood-vessels. According to structure the tumor was between fibroma and sarcoma.

Bode reports a healthy para-iii, with a spontaneous birth of a seven months' dead fetus on account of severe bleeding which was checked with tamponade. The afterbirth showed in the chorion, and separated from the mass of the placenta, a fist-size tumor which was supplied by three strongly developed blood-vessels. Schmorl explained the microscopic picture as that of fibroma or fibrosarcoma.

Pitha (1907) reviews sixty-three cases in the literature including twenty angiomas, fifteen myxoma fibrosum chorii, and eight myxoma fibrosum chorii teleangiectodes. He mentions many other varieties of related names with one or two cases of each. Two sarcoma are included with a question mark. These were reported by Hyrtl in 1870. In these cases Hyrtl described the microscopical findings thus: "In the 'getrübten Grundsubstanz' were elliptoid and spindle form nuclei" and this sufficed for him to call it sarcoma. Needless to say this superficial examination is inadmissible. No one knows what he meant by "getrübten Grundsubstanz." He evidently could not explain himself what he saw. We know that spindle cells do not necessarily prove sarcoma.

Another case of sarcoma was reported by Chabaud and Dupin in 1889. They described a sarcoma with abundant blood-vessels which they claimed had developed from the chorion through abnormal differentiation of the embryo cells. The microscopic aspect was the foundation for the diagnosis of sarcoma, but clinically there was no evidence of malignancy either in the mother or the child. It was doubtless simply a tumor of the chorion with numerous blood-vessels but a diagnosis of sarcoma is not justified from the aspect of the cells.

They speak of Galabin's case as neither fibroma or sarcoma and say from Galabin's description it was plainly a tumor developing from the chorion.

Bode's case examined by Schmorl (1898), Pitha thinks was described as sarcoma on account of the form of the stroma cells, but as there was no malignancy Pitha counts it among connective-tissue tumors and calls it fibromyxoma teleangiectodes. Leopold also reporting Bode's clinics (1895) says that among 8000 cases of tumor examined by him only one was a tumor of the placenta and that was angioma.

Briquel (1903) has written a book of 626 pages about tumors of the placenta and gives an outline of fifty-two cases from the literature, including three cases of sarcoma, those of Hyrtl and Galabin. He does not question their verity. He speaks of the different way

these tumors have been classified but says they have two fundamental characteristics: 1. they are all formed by conjunctive fetal elements at different stages analogous to those found in the normal placenta; 2, their extreme vascularity recalls the angioma with dilated capillaries, its atypic endothelioma, and the rudimentary state of its conjunctive structure. This is a very elaborate study from every point of view but lays no stress on sarcoma. In the section of the book treating of tumors of the placenta, these are divided into three groups: 1. conjunctive tumors; 2. vesicular moles; 3. true deciduoma.

Colin (1906) says on the question of histology, that if conjunctive tissue predominates one speaks of these tumors as fibroma, those of many cellules are spoken of as sarcoma, if the structure appears to be all mucous they are spoken of as myxoma of the chorion. Beyond this he does not go into the question of sarcoma.

Schindler (1907) refers to seventy-nine cases in the literature and reports two cases of his own. He says that through extensive increase in and closely approximated endothelial cell nuclei, arises the picture of numerous nuclei closely resembling sarcoma tissue. He calls his cases chorioangioma.

Dienst (1903) reports the four cases spoken of by all the other writers, *i.e.*, Hyrtl (two), Galabin (one), Dupin et Chabaud (one).

Kummer (1911) speaks of seventy-eight cases in the literature and reports one additional case. He does not go into the literature as has been done by others, notably Dienst and Kraus. They and most authors agree that in these tumors we have to deal with angioma of the vessels of the chorionic villi. He goes into the question of position, size, number, etc. He reports a case of fibroangioma, elaborately described and analyzed.

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BIBLIOGRAPHY.

Monographs.

Kummer, A., 1911. Zur Frage der Placentartumoren.

Colin, J. J., 1906. Contribution a l'étude des tumeurs conjunctives et particulièrement de angiomes du placenta.

Briquel, Paul. Tumeurs de placenta et tumeurs placentaires. Bibliography, 1903. Also *Bull. Acad. de med.*, 1904, 3s., lii, 16.

Articles.

Clark, John. (Philos. Trans., Lond., 1798.)

Pitha, W. Ueber Placentartumoren. *Wien. klin. Rundschau*, 1907, xxi, 441, 460, 475, 491, 509, 539, 556 (very complete article).

Pitha. Des tumeurs du placenta. *Ann. de gynec. et d'obstet.*, 1906, 2s., iii, 232.

Walz. Ueber Placentartumoren. *Verhandl. d. Deutsch. path. Gesellsch.*, 1906, Jena, 1907, 279.

Kermauner, F. Angioma der Placenta. *Arch. f. Gynäk.*, 1907, lxxxi, 554.

- Kummer, A. Zur Frage der Placentartumoren. *Beitr. z. Geb. u. Gyn.*, 1910, 11, xvi, 451.
- Strahl, H. Zur Kenntniss der Wiederkauerplacentartumoren. *Anat. Anz.*, Jena, 1911, xl, 257.
- Ravano, A. Placentartumoren. *Arch. f. Gynäk.*, 1908, lxxxvi, 110.
- Plauchu. Tumeurs benigne du placenta. *Rev. mens. de gynec. d'obstet. et de pediat.*, 1912, vii, 521.
- Ries, E. Angioma of the Placenta. *AM. JOUR. OBST.*, 1904, 1, 84.
- Labhardt, A. Beitrag zur Kasuistik der Placentartumoren. *Beitr. zur Geb. u. Gyn.*, 1904, viii, 185.
- Dienst, A. Ueber den Bau und die Histogenese der Placentargeschwülste. *Zeitsch. f. Geb. u. Gyn.*, 1903, lviii, 191.
- Bohnke. Eine Placentargeschwülste. *Deutsch. med. Wochensch.*, 1903, xxix, Ver. Beil, 279.
- Kraus, E. Angiom der Placenta. *Zeitsch. f. Geb. u. Gyn.*, 1903, 1, 53.
- Jeannin, C. Tumeurs du placenta et tumeurs placentaires. *Progres med.*, 1903, 3 s., xviii, 417.
- Albert. Ueber Angioma der Placenta. *Arch. f. Gynäk.*, 1898, lvi, 144.
- Niebergall. Ueber Placentargeschwülste. *Monatsschr. f. Geb. u. Gyn.*, 1897, vi, Hft. 5, 475.
- Schlagentauber. *Wien. klin. Woch.*, 1899.
- Kahn. *Dissertation, Giessen*, 1887.
- Virchow, R. 1863, p. 405.
- Hyrthl. Die Blutgefässe der menschlichen Nachgeburt, 1870.
- Dupin et Chabaud. *Gazette des Hopitaux de Toulouse*, 1889, iii, 73.
- Bode and Schmorl. Ueber Tumoren der Placenta. *Arch. f. Gyn.*, 1898, Bd. lvi, 73.
- Leopold. *Cent. f. Gyn.*, 1895, 34.
- Galabin. *Obstet. Trans.*, xxiv, 1882, xxvii, 1885.
- Schindler. Zur Kenntniss der Angiome der Placenta. *Arch. f. Gyn.*, 1907, 1908. Bd. lxxxiv, 423.

REPORT OF A CASE OF MONSTRA PER DEFECTUM.

BY

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(With two illustrations.)

As cases of this class fill a rather small space in the records, I deem mine of sufficient interest to justify its report; and I relate its conduct at some length, the progress of such cases presenting the unusual, though no effort is made regarding etiology.

Among some theories advanced regarding the cause of these abnormalities are heredity; injuries to abdomen and uterus; diseases of chorion and amnion; changes in the ovum during early stages by ther-

mic, chemical, or other physical action. Hertwig considers that chemical poisons circulating in the maternal blood may affect the young embryo and cause monsters. Stockard and Lewis produced monsters from the eggs of the common minnow by treating them with solutions of magnesium chloride, and experiments have proved that lithium, sodium, and potassium produce characteristic monsters, according to De Lee. Ballantyne and De Lee are convinced that shock, worry, deprivation, etc., may produce vascular and nutritional disturbances in the endometrium which may seriously affect the growth of the ovum.

In the classification of single monsters, the deformities resulting from the absence of closure of the medullary canal are grouped under the name "Craniorachischisis." The case in point is of the sub-classification "Acrania," the vertex and cranium being absent, with "Rachischisis" or spina bifida. A small amount of brain tissue being macroscopically evident, I do not class it as "anencephalus," though it would nominally be so placed.

The meninges covering the spinal canal were present with absence of skin.

Of additional note is the delivery at full term, very many of such cases on record being premature.

CASE.—Mrs. V., aged thirty. Nov. 12, 1913.

Family History.—Negative.

Personal History.—Negative—unusually healthy and strong as a girl.

Previous History.—Three years ago, abortion at three months, followed by curettage on two occasions without anesthesia, and subsequent endometritis. Health fair since that time.

One year ago delivered of a full-term still-born child, male, the labor necessitating instrumental delivery, complicated by oligohydramnios and preceded by albuminuria for about one month.

Present History.—During first weeks of pregnancy, before she recognized her condition, patient was subjected to nervous shock by unexpected arrival of her parents from the East and during their visit to considerable worry on account of changes in temperament incidental to her pregnancy and misunderstood by her guests.

From very early in the pregnancy, constipation was overcome by the use of daily laxative doses of a widely used and well-known bottled mineral water, which contains the principal salines.

First examination of the urine on August 30, 1913, showed no albumin and urine normal.

First examination of patient on October 3, 1913. At this time a distorted uterus was evident, high on right side and extending on left at level of umbilicus. The appearance suggested twin pregnancy but heart sounds could not be identified though fetal movements were perceptible in the nature of sudden kicking and not

movements in which parts could be palpated. The condition was unmistakable hydramnion, but as pronounced albuminuria was present at this time the excess of fluid was regarded as eclamptic and fetal abnormality not considered.

A restricted, meat-free diet, was prescribed with daily baths and ten-minute breathing exercises night and morning out of doors. The albumin disappeared from the urine after two weeks.

Between Oct. 1 and the date of delivery, Nov. 12, the uterus enlarged so rapidly that during the last week the distention caused



FIG. 1.—Anencephalus.

dyspnea and pain in the back from pressure and patient was unable to sleep reclining and sat up nights during that time. For three days preceding labor, the patient was conscious of strong contractions every hour or two, though they were short and caused only mild discomfort.

Vaginal examination at 5.30 P. M. Nov. 12 disclosed three-finger dilatation of cervix with presenting part floating at brim.

At 10.30 P. M. in consultation with Dr. C. C. Harbaugh, who in view of the previous still-birth, had been engaged as consultant, I

found but little further dilatation, no engagement and weak contractions due to the overdistention. I then ruptured the membranes and an enormous quantity of fluid drained off, allowing engagement of the head. After forty-five minutes hard contractions ensued and after about an hour and a half the cervix was completely dilated, without any perceptible descent of the presenting part.

As bearing on the diagnostic difficulties special mention must be given the touch picture now presented. The first impression was of face presentation; however, the presence of a firm though com-



FIG. 2.—Anencephalus.

pressible excrescence anterior and in the center of the part presenting, simulated prolapsed cord, and subsequently proved to be an ear-like mass of brain tissue and meninges. Two large protuberances felt posteriorly and to the right and left sides respectively proved post-partum to be the large frog-like eyes. Added to this were sharp edges of bone around the rim posterior and laterally giving a touch picture that was a puzzle.

Anesthesia and application of forceps resulted, after some difficulty, in delivery of monster shown in cuts, same weighing 3 1/2 pounds. Though small, the faulty presentation resulted in

delivery in the diameter—left brow to right shoulder—and lacerated perineum.

Third stage was normal and patient made a good recovery.

The pictures were taken some time after specimen was placed in preservative and hardened into position shown. Skin mutilations resulted from subsequent injury, the integument being perfect at delivery, and movements felt immediately preceding rupture of membranes attested to living fetus at that time.

TRANSACTIONS OF THE NEW YORK OBSTETRICAL SOCIETY.

Stated Meeting held January 13, 1914.

The President, HOWARD C. TAYLOR, M. D., in the Chair.

DR. W. H. CARY presented a report on

AN AUTHENTIC CASE OF SARCOMA OF THE PLACENTA.*

DISCUSSION.

DR. ROBERT T. FRANK in discussing the case said: "The case is evidently one of extreme rarity and considering the authoritative sources which confirm the diagnosis of sarcoma of the placenta, and personally not having seen the slides, I naturally feel extremely diffident in expressing any opinion. From the description furnished by Dr. Williams I should judge that although rare, these cases are by no means unique. When in such a tumor (an apparently benign tumor) it becomes necessary to interpret a malignant change, certain, possibly insurmountable, difficulties must arise. The placenta is an extremely vascular organ which never goes beyond the fetal condition. Therefore any tumors which arise in such an organ most likely would also remain in the fetal stage. Now in Dr. William's report he mentions the following components:"

"In the first place, (what he takes to be the basic condition), an angioma (a chorioangioma); secondly, myxomatous tissue (a typically fetal tissue), and lastly, perivascular small cells. This description also closely fits types of fairly normal fetal connective tissue. Before being willing to admit that this is a sarcoma, in other words, a malignant tumor, as the pathological criteria are bound to be misleading, because we are dealing with fetal tissue which often resembles undifferentiated (possibly malignant) tissues, I should say that the further course should be watched with great care. If this proves to be entirely nonmalignant, and as this tumor apparently was not infiltrating, I should still advise extreme caution in classifying it as a true sarcoma. Myxomatous and perivascular cell areas in a fetal structure will not have the same significance as if they occurred in an adult organ. If no symptoms develop in the

* For original article see page 658.

uterus, some might say that this is explained by the fact that the entire mass was extruded postpartum, but on the other hand we find recurrence in chorioepithelioma. Of course there is no reason why a sarcoma cannot occur in the placenta as well as in any other structure but I simply want to point out the difficulties which are bound to be met in arriving at such a conclusion."

DR. HENRY D. FURNISS presented a specimen of

EARLY TUBERCULOSIS OF THE KIDNEY.

The patient, a single woman twenty-one years of age, developed a tubercular process in the left knee six years ago which was treated by immobilization. At the same time she had a tubercular focus in the left ulna which was treated by incision and drainage and required a whole year to heal. On January 15, 1913, the patient passed bloody urine on three occasions in rather large amounts, and for a month after noticed slight bleeding. There was no frequency of urination, but some pain was present during the following two months, which kept her in bed for a week during March. About March 15 she had an attack of pain in the right renal region which lasted an hour, and in April a similar one. These attacks were sometimes associated with nausea. Since April the patient has had three additional seizures, the last one on October 1, 1913, but these have been less painful than the former attacks. Since January, 1913, the woman lost 15 pounds in weight although in the past three months she has gained 5 pounds. The urine showed the presence of pus and albumin and search also revealed tubercle bacilli. Cystoscopy disclosed evidences of a mild cystitis with some induration and infiltration in and around the right ureteric orifice. Both ureters were catheterized, from the right purulent urine containing tubercle bacilli was obtained. From the left the urine was free from pus and tubercle bacilli. On October 21, 1913, the right kidney was removed through a transverse lumbar incision. The kidney appeared normal except for some thickening just below the middle and the ureter was also thickened. The wound was closed without drainage. On November 10, 1913, the urine was found free from pus, the wound was healed and the patient much improved. On the third day after operation the urine was markedly blood stained and this lasted for twenty-four hours. Subsequent examination of the kidney showed that the organ was of normal size. A section taken at the upper pole showed an indurated whitish area with loss of kidney structure. Just below this on the cortex is seen another wedge-shaped area, the base of which is about one-fourth of an inch wide. The apex of one of the upper papillæ is slightly ulcerated. On the surface of the kidney at the middle, and just below the middle are seen two other areas of tuberculous infection.

DR. FURNISS also reported a case which presented

THREE URETERS, ONE OPENING EXTRAVESICALLY.

The patient, age twenty years, was seen in June, 1913. She stated that as far back as she could remember, she has been constantly wet

with urine day and night. There was no complaint of pain or other disturbance. She voided normally two or three times daily and did not get up at night. From this history, a ureter opening extravasically was suspected and the examination was conducted with this idea in mind. The genitals appeared normal on inspection. Indigocarmine was injected intravenously and the vagina and vestibule packed with wet cotton. At the end of fifteen minutes it was seen that the cotton over the urethra was faintly stained and upon closer inspection a very small opening was found just underneath the urinary meatus. This could be catheterized to the depth of $1\frac{1}{2}$ inches, and from it the catheter seemed to turn to the left. Through the catheter a small amount of faintly stained clear fluid was collected within a short time. Cystoscopy showed a perfectly normal bladder with a ureter on either side in a normal position and a diagnosis of supernumerary extravasical ureter was made. At the Post-Graduate Hospital, June 28, 1913, under ether anesthesia, the supernumerary ureter was catheterized for about 4 inches and an incision was made into the mucosa covering the under surface of the urethra. Unfortunately the incision went into the ureter which was here dilated to the size of a large lead pencil and this dilatation extended over only the distal inch of the ureter. A sound was then passed in the bladder and made to bulge the floor of this sac. An opening was next made into the bladder. The bladder mucosa and the mucosa of the sac were united with fine catgut thus forming a fistula. The ureteral sac was then closed with fine catgut in such a way that the distal end was obstructed; thus the ureter was made to enter the sac, and from the sac to the bladder a fistula was formed. A second line of sutures closing the sac was inserted and the vaginal mucosa was approximated with silkworm gut. The original plan was to dissect out the ureter for a distance of from $1\frac{1}{2}$ to 2 inches; then to make an opening into the bladder from the bed within which the ureter was dissected and through this to put the ureter into the bladder. On account of the dilatation of the distal end of the ureter which thinned out the ureteral wall and owing to the thin character of the mucosa covering this canal, this method of operation had to be changed. After the operation there was no leakage for two days. The catheter was removed from the bladder but on the next day the patient began to wet herself as usual. On July 11 another operation was attempted. The fistulous opening was found in the posterior end of the former wound. The ureter was dissected backward for $1\frac{1}{2}$ inches and found to increase in size toward the renal end. A suture was placed through the end of the ureter and a sound into the bladder. The sound was made to bulge a portion of the posterior wall of the bladder backward and to the left and over this a small incision was made. The suture was tied to the sound and the ureter pulled into the bladder where it was held in place by a single suture inserted just below the clitoris. A permanent catheter was left in place for four days. The patient had much pain on urination after the operation which was relieved by instillations of a 4 per cent. cocaine solution previous to urination. There has been no leakage of urine from the bladder since the operation.

DISCUSSION.

DR. R. T. FRANK in opening the discussion said: "I would like to ask Dr. Furniss whether there is not a certain amount of risk involved in this intravesical transplantation. Evidently these accessory ureters are rather small in size, functionate imperfectly, and are subject to dilatation due to obstruction. Therefore, it seems to me, a distinct risk is taken in transposing such a rudimentary ureter into the bladder. Would it not be better, if technical difficulties do not make it absolutely impossible, to expose such a ureter near the kidney and put it out of function by ligation or other method? If complete catheterization is impossible, I should think that the introduction of argyrol or some similar substance would allow the operator to have a satisfactory x-ray made showing the course of the ureter and then based upon this, to plan a lumbar operation to reach the ureter near the kidney. That method should effect an immediate cure and at the same time obviate any possibility of subsequent trouble due to poor drainage."

DR. HENRY D. FURNISS in closing said: "Operations in which the ureters have been ligated at the lower ends have been very unsatisfactory. I think that in the literature, six cases are noted in which ligation was done and only one was successful. In one of the cases referred to, a resection of the upper part of the kidney was successfully done but I venture to say that it is a very bloody operation and one in which it might be necessary to remove the entire kidney on account of complications. Results from vaginal transplantation are the most satisfactory. One of the reasons why I did not inject the kidneys with argyrol was, because the liability to infection would not be compensated for by the possible knowledge which I might have gained. By this procedure it would have been impossible to study the relations of the two ureters so that when transplanted this could have been done without wrapping one around the other. In the extravesical opening of supernumerary ureters, the usual agreement is that the lower and abnormally situated one goes to the upper pole of the kidney. In supernumerary ureters opening into the bladder, the ureter opening nearer the urethra goes to the upper pole of the kidney, as others and myself have shown by dissection and argyrol radiographs.

DR. GEO. W. KOSMAK presented a report of a case of

PELVIC HEMATOCELE SUGGESTING ABDOMINAL PREGNANCY.

This patient, Mrs. J. B., age eighteen, born in Italy, married, was admitted to the service of Dr. A. B. Davis at the Lying-in Hospital on December 30, 1913, with a diagnosis of incomplete abortion. She had a normal labor eight months previously with a full-term child and an uneventful puerperium. Her menstruation began at twelve and one-half years, was always regular. One month after labor she began to bleed again and subsequently had periods in June and July. After the latter date she did not see anything more, thought she was pregnant and consequently stopped nursing her

baby in August. In November, six weeks previous to her admission to the hospital, she began to bleed slightly and after a week complained of indefinite abdominal pain in the lower abdomen, back and sides. After the first week the bleeding increased in amount but was irregular. She was given some medicine by a doctor who was called in but the hemorrhage continued. She came to the hospital with the idea that she had had a miscarriage and desired to be curetted. Examination on admission showed a woman moderately well nourished and otherwise normal. Vaginal examination disclosed the cervix high up under the symphysis, slightly dilated and bleeding. The uterus seemed somewhat enlarged but was difficult to map out. It did not appear to be freely movable and there was considerable sensitiveness over the left iliac region where a soft mass could be felt. Examination of the blood at this time showed 4,600,000 red cells and 8800 leukocytes. The urine showed a trace of albumen. There was no rise of temperature and the pulse rate was 80.

In view of the history, the irregular bleeding and pain, and the mass felt in the left side, an examination under anesthesia was decided on. This was done on January 1, 1914, and showed a slightly enlarged hard uterus, firmly held in the pelvis by a mass on either side which could not be differentiated from the same. The introduction of a sound showed the uterine canal to be about $5\frac{1}{2}$ inches long. The cervix was then dilated and the interior of the uterus explored with the finger, which showed it to be empty. For the purpose of determining the nature of the pelvic mass, a laparotomy was done through the right rectus muscle. The peritoneal cavity was found to be free from blood. Examination of the pelvic contents showed a mass consisting of the uterus and a large sac posterior to the same to which the intestines were firmly adherent. In stripping them off, this sac was ruptured and about $1\frac{1}{2}$ pint of dark thin blood was evacuated which had no odor. Further exploration showed that the right tube was enlarged, tortuous, and the fimbriated extremity very much distended and hypertrophied. It was surrounded by a mass of dense adhesions but was finally removed, together with the remains of the ruptured sac in which the tip of the appendix was also found. The left tube showed an enlargement in its middle portion about as large as a pigeon's egg. This tube was also removed but the left ovary was left in place although slightly cystic. Considerable oozing and some free bleeding occurred in stripping the adhesions to the sac but this was successfully checked before the abdomen was closed. There were no evidences of pus and it was not thought necessary to employ drainage. The remains of the sac referred to could not be entirely freed from the posterior surface of the uterus and a considerable portion had to be left in place. The uterus was then suspended from the anterior abdominal wall by a single chromic gut suture and the abdomen closed in three layers. The patient stood the operation well and was removed from the table in good condition.

The condition of the right tube, and the presence of a sac posterior to the uterus and broad ligament to which the intestines were ad-

herent, led to the diagnosis of a possible abdominal pregnancy following tubal abortion which had proceeded to a certain stage and then remained quiescent. A search for the fetus or placental tissue was not successful. The mass in the other tube seemed very much like an unruptured ectopic pregnancy but this diagnosis does not seem to be borne out by the histological examination of the specimens. Dr. J. R. Losee, the pathologist to the Lying-in Hospital, reports as follows regarding the same.

One of the Fallopian tubes very much increased in size shows on section a thinned out wall enclosing a large hematoma. Microscopical examination shows this to be a blood clot with atrophy of the tubal wall due to pressure from the same. The other tube is increased in size and has some exudate over its surface but a microscopical examination of this section shows congestion only. The excised ovary which was attached to a portion of the sac is infiltrated throughout with red blood cells.

The wall of the cystic tumor was smooth on the outside but irregular and covered with an exudate on the inside. It is 0.5 cm. thick and the microscopical examination shows that it is composed of fibrous tissue on the inner surface of which there are a few red blood cells and leukocytes. There are no evidences of decidua present and it is probably the result of a former inflammatory process.

From the history of the case a diagnosis first of incomplete abortion and then of ectopic pregnancy was a reasonable one to make and justified an exploratory operation. The case however shows quite distinctly that a train of symptoms of this kind may readily lead to a diagnosis which is not borne out by the anatomical findings. Nevertheless, I feel convinced that absorption of the large hematocele in the pelvis would not have occurred without a disturbing train of symptoms and the possibility of an infection or the formation of a pelvic abscess.

The patient made a perfect recovery and was discharged from the hospital on the twelfth day.

DR. HIRAM VINEBERG reported a case of

RAPID RECURRENCE FOLLOWING TOTAL HYSTERECTOMY OF A FIBROMYOMA WITH SARCOMATOUS ELEMENTS.

Mrs. D. P., aged forty-eight years, widowed eight months, mother of four children, the last eighteen years ago; one miscarriage thirteen years ago, was brought to my office May 11, 1912. She had enjoyed good health until about a year ago, since then she has suffered from profuse menorrhagia. The flow recurred every four weeks, lasted ten to fourteen days and was very profuse, attended with passage of several clots. The first two days of the flow were accompanied by severe pain in both iliac regions, most severe on the left side. During the past winter she had amenorrhea of about two months on two different occasions. Prior to the period of menorrhagia, the menstrual flow was of the four weekly type, of three days duration and of moderate amount. On examination I found a

smooth, hard tumor connected with the cervix and reaching almost to the umbilicus. The diagnosis of a fibromyoma was made. May 14, three days later, the patient was operated upon by me at Mt. Sinai Hospital. The entire uterine tumor with the cervix and adnexa were removed *en masse*. The appendix was slightly thickened and was also removed. The edges of the vaginal wound were sutured as were also the layers of the broad ligaments on either side, down to the vaginal wound.

The patient made an uneventful recovery. The tumor which, to the naked eye, appeared nothing more than an ordinary fibroid, was sent to the pathological laboratory for microscopic examination. The pathologist pronounced the tumor to be a fibromyoma. The adnexa were normal.

On Oct. 9, 1913, seventeen months after the operation, the patient again appeared at my office. I was shocked and surprised to note her changed appearance. She looked pale and emaciated and gave the following history. Several months before, she observed a mass in the abdomen and during the same period, had been steadily growing weaker and suffered more or less pain over the entire abdomen. I found the pelvis filled with irregular masses, which seemed to be connected with others higher up, that reached to a line above the umbilicus. On reporting this to the pathological laboratory, a further examination of the tumor was made, which now revealed several areas of spindle-celled sarcoma, evidently springing from the tunica adventitia of the blood-vessels. The patient clamored to be relieved surgically, and though the condition was looked upon as probably inoperable, I was induced to give her the benefit of the doubt and accordingly I reopened the abdomen and found several masses, closely agglutinated with the omentum and intestines. With considerable difficulty I removed three of these, each the size of a closed fist, but there were others in the pelvis which were so closely adherent to the pelvic structures, that I desisted, from an attempt to remove them. The removed masses were found on microscopic examination to be angiosarcoma mostly of the round cell type.

The patient made a slow recovery from the operation and during the end of her stay in the hospital, she was given three x-ray treatments. On her discharge, the lower part of the abdomen seemed to be filled again with numerous masses. She was seen again by me a couple of weeks ago and there did not appear to be any marked change either in the local or general condition. The case is of interest in that it illustrates how difficult it is to even suspect sarcomatous degeneration with the naked eye. It is difficult to explain why with so little malignant change there should have been so early a recurrence in view of the radical nature of the operation.

The paper of the evening was read by DR. C. F. JELLINGHAUS and was written in collaboration with DR. J. R. LOSEE. It was entitled

THE ABDERHALDEN TEST FOR PREGNANCY.*

*For original article see page 593.

DISCUSSION.

DR. R. T. FRANK in opening the discussion said: "Personally I have never used this method. I have, however, had considerable experience with all the predecessors of the Abderhalden method and I can summarize each with the conclusion reached by Dr. Jellinghaus; that while each one of these methods has met with a great deal of acclaim at the outset, as one or two years have passed and statistics have been gathered from various sources, numerous errors have been detected, and gradually some newer method has replaced it with about equal lack of permanent success. It is very true that the Abderhalden method for the first time offers a very plausible theoretical basis for such work, but, as Dr. Jellinghaus has very plainly brought out, in practice the sources of error are so numerous and so incalculable that even an expert laboratory worker will surely meet with many unforeseen difficulties. This applies in even greater degree to the average clinician who might hope to take up this test as a diagnostic method. From a biological point of view, I think the objection to be made to the Abderhalden test is this; that the specificity of various albumins is not as great as the first research workers hoped that it was. Probably (although Abderhalden disclaims this) allied substances will give this test to a certain degree, and as ferment reactions are only quantitative, the possibility of error is, therefore greatly increased. I personally, for instance, would not dare to operate on a patient if a diagnosis of ectopic pregnancy were made, solely by the aid of the Abderhalden test. I would much prefer, at the present moment, to base my diagnosis upon purely clinical criteria."

DR. L. W. STRONG said: "I have been much interested in Dr. Jellinghaus' very careful study of the difficulties of this test and I entirely sympathize with his conclusions. He seems to give us the impression, however, that the basis of the technic was firmly established. Nevertheless I do not think that even this is absolutely demonstrated and my observations incline me to be skeptical. To completely demonstrate a ferment action, one should be able to demonstrate the corresponding antiferment which must necessarily be present. If there is a ferment in the maternal circulation capable of dissolving placental tissue, there must also be a corresponding protective antiferment in the fetal circulation. Serum from the placenta should neutralize or inactivate the maternal serum. This I have been unable to demonstrate and until it is demonstrated the theory of ferment activity must be in abeyance. In regard to the difficulties of the technic, they are all present. The Germans especially will say when one reports unfavorable results, "you did not rigidly follow the Abderhalden technic, thus blaming the result to the faulty technic. But in going over the technic in its entirety there are many things which can be shown to have no such effect. Thus the presence of hemoglobin is stated to give positive reactions. I have tested many sera, both with the spectroscope and with guaiac for hemoglobin and I have demonstrated that hemoglobin may be

present in considerable amount without a positive reaction. In regard to placental albumin, I know that boiling for a long time will reduce or destroy its activity. I have taken two samples of the same placenta, boiled both to the point of negative reaction, and then by reboiling one-half, still further have I destroyed its activity. I know that putrefaction is not the cause of bad results. I have been able by careful asepsis to work without toluol and to eliminate putrefaction, but the results are no more uniform than when no such care is taken. Altogether I would say that not only is the test at present unreliable but that mere refinement of technic will not result in making it reliable. Certainly in the diagnosis of malignancy, in which I am particularly interested, I have no hope for its usefulness."

DR. C. F. JELLINGHAUS in closing the discussion said: "I would just like to add one word to what Dr. Strong has said. We remarked in our paper that we believed that the Abderhalden ferment theory was correct and that the test was difficult to do, but we were conservative. Dr. Strong goes farther and even seems to think that there is no way of proving that that theory is correct or that it will ever be perfected. The only reason in our minds is that the dialyzation method has not always given perfect results. The reason for making this remark is that there are, no doubt, many men who say it is absolutely perfect and reliable. There must be some good and honest workers among them and I believe, therefore, in saying that although in our hands it is not infallible, there may be some that can do it. In this country there have been several articles by different men, all of whom say that it is a satisfactory method. I would like to see an invitation extended to them to do the test on five pregnant and five nonpregnant women and I am sure that a good many will change their minds or they will change our minds about the articles."

TRANSACTIONS OF THE OBSTETRICAL SOCIETY OF PHILADELPHIA.

Meeting of November 6, 1913.

The President, GEORGE M. BOYD, M. D., in the Chair.

DR. EDWARD A. SCHUMANN read a paper on

THE MECHANISM OF LABOR FROM THE STANDPOINT OF COMPARATIVE
ANATOMY,*

with a report of four fatal cases of dystocia among wild animals.

*For original article see page 637.

DISCUSSION.

DR. BARTON COOKE HIRST.—I do not think any of us are competent to discuss this paper. All we can do is to express our admiration for the work of Dr. Schumann in collecting these very remarkable and instructive facts.

DR. HERBERT FOX.—It seems odd that a pathologist should discuss an obstetrical paper. This case of osteomalacia of the pelvis interested me because I tried to do a version. I was able to dilate the cervix and get out the legs down to the pelvis when the animal died. The Barbary ape is a squatter. Monkeys very frequently have osteomalacia. The males have osteomalacia quite as frequently as the females and the attitude of the animal both male and female is the same. I have one specimen in which the pelvis is actually pointing forward as the animal squats, sitting on the lumbar vertebræ.

DR. WILMER KRUSEN reported a case of

UTERUS UNICORNIS DIDELPHYS.

The patient was admitted to the Samaritan Hospital for operative treatment for prolapsus uteri. She had had four children, normal pregnancies, parturitions and puerperiums. Upon opening the abdomen she was found to have a uterus didelphys unicornis, which had not been suspected upon bimanual examination. On the right side was found an undeveloped ovary, and the tube was simply a cord-like band. The ovary on the left side was normal, and the uterus naturally was deviated to the left side of the pelvis. As this woman had presented no difficulties with her pregnancies and labors, it was decided to do a ventro suspension. It was impossible to use any of the round-ligament operation owing to the maldevelopment on the right side.

DR. CATHARINE MACFARLANE presented

A GRAPHIC MENSTRUAL CHART.

The chart which I wish to call to your attention was designed to record in graphic form the menstrual history of gynecological cases. It is essentially a one page, yearly calendar, arranged in columns of lunar months so that regularly recurring menstrual periods are recorded at the same relative point on the chart month by month; whereas menstrual irregularities, when recorded, immediately attract attention by the atypical appearance of the chart.

Under each date is a column of five empty squares and in the margin the words "Pain," "Clots," "Free flow," "Moderate" and "Scanty" are printed. By filling in the corresponding squares under any given date the essential features of the menstrual flow on that date are graphically recorded and can be referred to subsequently with ease. When filled in for a series of months, a complete picture of the menstrual cycle may be seen at a glance.

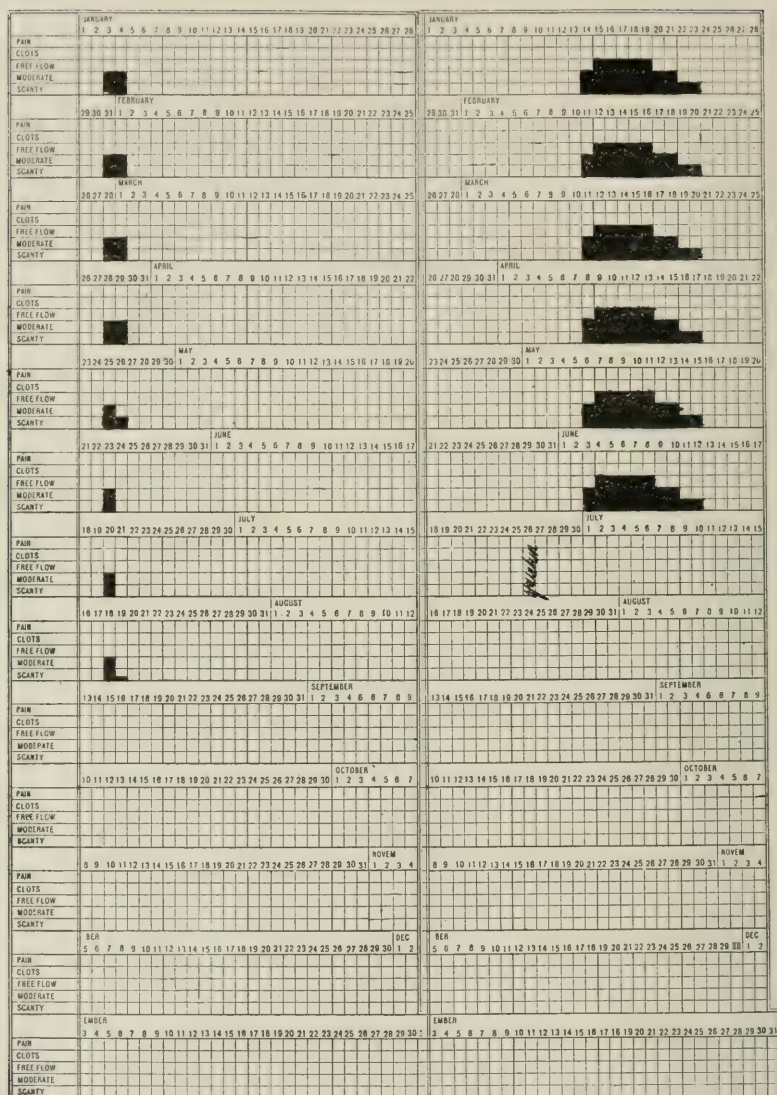


CHART I.

CHART II.

CHART I.—Scanty menstruation in hypothyroidism.

CHART II.—Prolonged and profuse but regular periods in case of uterine fibroid.

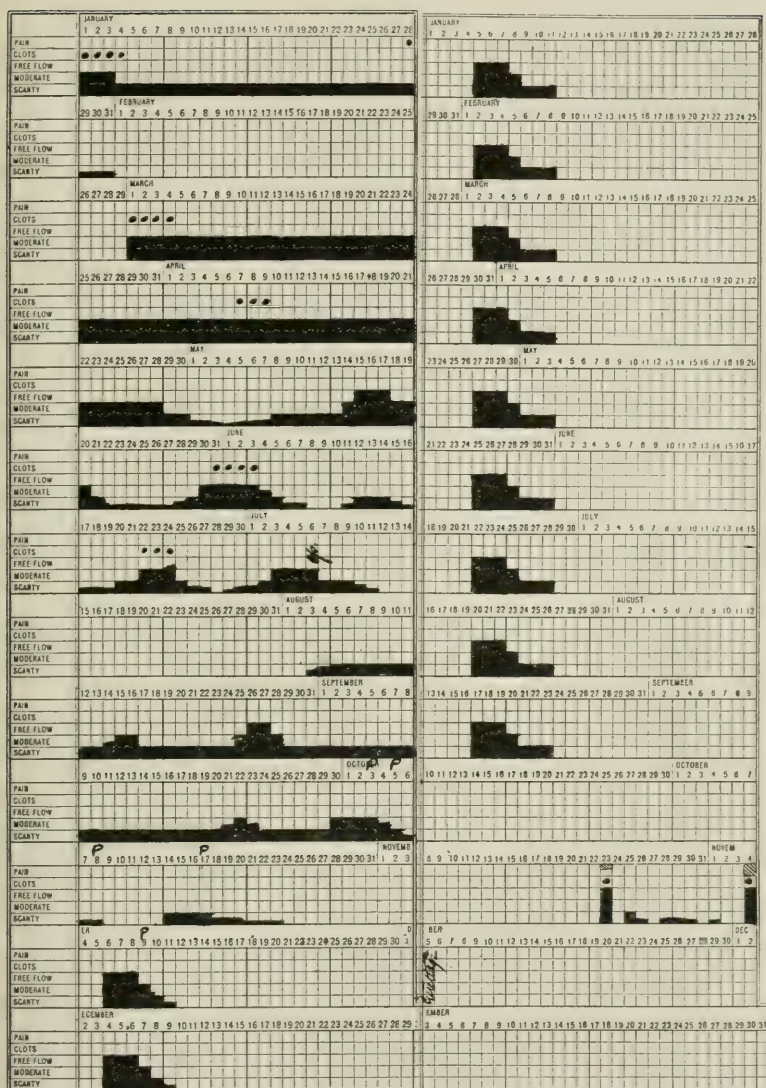


CHART III.

CHART IV.

CHART III.—Irregular bleeding in vasomotor insufficiency.

CHART IV.—Incomplete abortion.

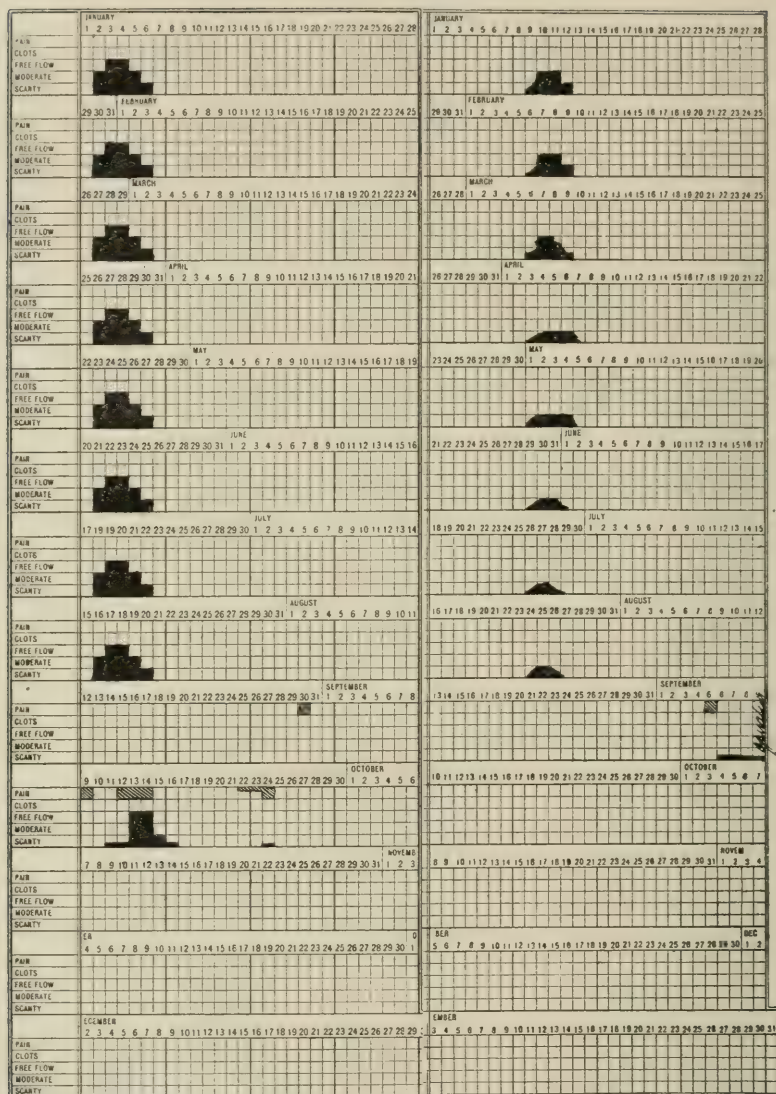


CHART V.

CHART VI.

CHARTS V AND VI.—Ectopic pregnancy.

Sept. 5th.—Fainted from pain.

Sept. 9th.—Operation.

Sept. 30th.—Fainted from pain.

Oct. 24th.—Removal of unruptured ectopic pregnancy.

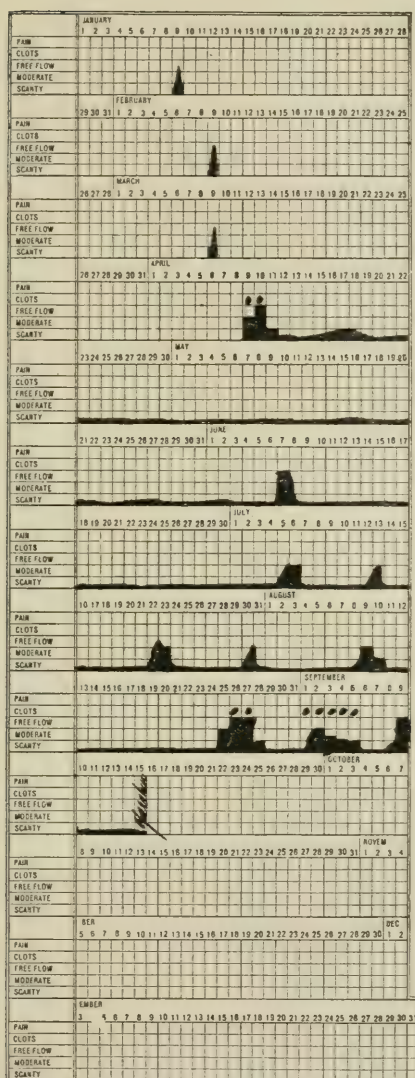


CHART VII.—Adenocarcinoma corpus uteri.

DR. BARTON COOKE HIRST read a paper on

COMBINED ANESTHESIA.*

DISCUSSION.

DR. B. F. BAER.—I am glad that Dr. Hirst has brought this subject before us.

I read this paper of Dr. Crile's and I confess that I did not, at first at least, understand it. Then I reread it several times and I must say that I was startled that a surgeon of Dr. Crile's experience should express such peculiar views. It seemed to me so unscientific, so impracticable, so useless, if not harmful, that it was not worth while to give it further attention; that it would pass on out among the curious theories that are soon forgotten; but, after listening to Dr. Hirst I believe a few words of discussion may not be out of place. I am in perfect agreement with Dr. Hirst as to the uselessness of combined general and local anesthesia. To delay and prolong the operation while the meso-appendix is being injected under this theory, so that the little appendix, for instance, may be removed without leaving an unpleasant impression on the brain, seems to me like departing from the rational and entering the mystic zone. To anesthetize each nerve and nerve fibril by injection as the operation is proceeding is as unnecessary as it is impossible.

It goes without saying that every humane surgeon believes in removing all noxious associations and surroundings, both mental and physical. More than twenty-five years ago I formulated a schedule for the preparatory and after management in abdominal operations, with this purpose in full view. The most important paragraphs in the schedule are those directed to the necessity of keeping the intestinal canal patulous so that retention of gas may not occur; and, second, the use of hypodermic morphine for its anodine and apathetic influence. The first hypodermic of $\frac{1}{4}$ grain of morphia sulphate is given toward the end of the operation, and it enables the patient to sleep beyond the Maudlin stage of returning consciousness. Afterward it is given in $\frac{1}{8}$ grain doses, or less, as often as indicated, during the first twenty-four hours. Plain ether is the anesthetic I prefer and when I have an anesthetizer in whom I have confidence, I feel safe with it.

DR. RICHARD C. NORRIS.—I think the only value of a statistical report is a critical analysis of every case that adds to the mortality of the group of cases studied.

I do not think we can give a useful statistical report without a detailed description of every case that died. The student of the statistics can then draw his conclusion as to the cause of death, and not be compelled to accept the operator's opinion of the death.

I returned from the meeting of the Congress of Physicians and Surgeons in Washington with the thought that the most important thing I had heard at that meeting was Dr. Crile's paper before the American Gynecological Society. I don't know whether Dr. Baer

* For original article see page 617.

in reading his paper has grasped what Dr. Crile means by anoci association. He certainly does not mean that he gives general anesthesia and then uses local anesthesia in order that there may be no pain. My idea of his procedure is that he will so block the environment of the wounded area that shock to the nerve centers—some impulse that is carried from each wound that we make, to the brain centers—is prevented by this subsequent local anesthesia. It does seem, as Dr. Hirst has said, that the infiltration of tissues would give rise to sloughing. We do know that strict asepsis reduces that to a minimum. We utilize salt solution for hypodermoclysis without great fear of suppuration. There must be, from Dr. Crile's experience, a point at which tissues may be infiltrated with aseptic solutions sufficiently to prevent this impulse to the brain centers and that will not interfere with the regeneration of those tissues and the healing of the wounds. Otherwise, Dr. Crile would have observed the disadvantages and referred to some means to prevent them.

I have little use for local anesthesia in the operative procedures of obstetrics or gynecology. I almost never use it. I do hear of its usefulness among the general surgeons. I would not hesitate to use and have used it in some extreme cases.

If I am in error, some one will please correct me. As I take it the essential idea of Dr. Crile's method is not to relieve pain, but to prevent shock. He presented a comparative statistical study, by curves, of two periods of ten years' work. The variation in the class of cases must have been reduced to a minimum. He stated that increase of skill should be discounted. I am not a convert to the plan. I have been told that to carry out the details of that particular line of treatment requires a training of your establishment—I was going to say, from the man who cleans the operating room to the operator himself. Every assistant along the line must be especially trained. The attitude of every attendant toward the patient is different from what we find in hospitals generally. I have never been in Dr. Crile's clinic to see his work and have heard only from those men who have been there. I am hoping, from the results which Dr. Crile claims, from the admiration that has been accorded him throughout the world, that there really is something in the method, and that these objections that may arise Dr. Crile will explain a way and prove to us still further that his claims are justified. If I have an opportunity to see his work I certainly intend to take advantage of it. At the present time I am not prepared to adopt his method. It seems to me that to anesthetize every tissue is a waste of time. It may be that in his enthusiasm he has carried the theory to a wider extent than is necessary. There may be, indeed I believe there are types, of cases in which the patients are particularly apprehensive of operations where his plan is of the greatest value. In another type it may be an unnecessary procedure. In other words, the time has come for us to study his principles, see wherein the enthusiasm of the investigator may be discounted, and get from his work the germ of truth.

DR. F. HURST MAIER.—Contrary to Dr. Hirst's views I believe that there is merit in anoci association. It is the experience of all surgeons that they lose some cases from shock. Dr. Crile's theory that death results in these cases from the destruction of the brain cells induced by the trauma, and his method of combating it is most plausible.

Concerning the possibility of increased morbidity: I am in accord with Dr. Norris' remarks that we inject saline and other solutions under aseptic precautions without injury to the tissues.

I have practised anoci association in a sufficient number of cases to induce me to continue until I determine its value for myself. Apart from the matter of shock, the convalescence of those in which I employed it were singularly free from postoperative pain.

DR. JOHN A. MCGLINN.—Hospital reports, as a rule, are practically valueless. There is only one hospital in the city, so far as I know, where any real effort is made to properly classify cases and that is St. Joseph's. Dr. Spellissy has been doing a remarkable work there in properly classifying cases, and issuing reports which from diagnostic standpoint and that of results really mean something. As Dr. Norris has said, hospital statistics are useless unless they are published with the particular type of treatment. Statistics depend also for their value upon the type of case. We sometimes run through a long series of cases without a death. Last year at St. Agnes gynecological service we did not have a death. This year three deaths have occurred. The type of cases which come into the hospital determine what the mortality will be in a certain series. I think a comparison of five years' work with that of the five previous years is not a fair one. Our methods have been improved, details are eliminated which give less opportunity for error. A correct comparison I think would be the comparison of the work of a good surgeon with that of Dr. Crile during the same period. While there is edema Dr. Crile says there has been no serious trouble with wounds. Hertzler has said that in hysterectomy there is danger of the ligature cutting through and causing secondary hemorrhage.

The cause of death in many of the cases is a question of the selection of cases in regard to the condition of the heart and kidneys and the form of anesthesia. The state of the patient before operation also is a factor in the cause of death. I very seldom see shock following the ordinary pelvic operations. Personally I do not see the great value of the blocking off of the nerve impulse inasmuch as the mortality at the present time is so low. Still, if Dr. Crile proves that there is reduction of mortality we must adopt the method.

DR. HIRST, closing.—I have secured in part what I hoped for. In conclusion, all I have to say is that I wish we would take up this subject of hospital statistics seriously. In these statistics of mine I might be justified in excluding some of the deaths. But if I began to juggle with my statistics, I could have a mortality lower than Dr. Crile's without combined local and general anesthesia.

The value of one part of Dr. Crile's theory about anoci-association

no one disputes. It is a splendid thought to obliterate the fear of operation in apprehensive nervous people by not letting the patient know when the operation is to be done. But whether this double anesthesia is going to do any good is questionable. Personally, I do not feel that it will. If it does not, it seems to me that younger surgeons ought to have a word of warning on the subject.

DR. HARTZ read a paper on the

IODINE TREATMENT OF GONORRHEA.*

DISCUSSION.

DR. P. BROOKE BLAND.—I have been very much interested in the work which Dr. Hartz has been doing with this solution of iodine. He has used this material successfully, both in acute and chronic infections of gonorrheal origin, and also in infections due to other pyogenic cocci. This treatment, of course, has been applied, he said, to infection of the lower portion of the genital canal. I have also personally used this solution in gonorrheal salpingitis, where upon operation I found pus exuding from the Fallopian tubes. After freely "milking" the tubes, I, on two or three occasions, filled the organs with a weak solution of Lugol's solution, and in none of the cases did I have any disturbance during convalescence or any subsequent exacerbation. As to the results obtained by the use of this solution of iodine, in the treatment of the conditions in discussion, I can fully testify to the claims set forth in the paper just presented. In our work at present in the dispensary in the treatment of the classes of cases described, I have been able to obtain more comfort and knowledge from the use of this solution than any agent heretofore employed. Our former experience of sitting passively and waiting for the first sign of adnexal and deep pelvic involvement, followed by the admission of the patient to the wards with subsequent sacrificial operation, has been changed. We now, provided the patient is placed under treatment in the early acute stage, look forward to an early arrest of the disease and the prevention of its extension to the deep pelvic organs. Indeed, I can recall but one case of acute gonorrhea where the disease reached the pelvis, after the institution of the plan of treatment described by Dr. Hartz, and, indeed, it is highly probable that in this instance tubal infection had taken place before the patient came under our observation. From personal observation, I believe that one is justified in making the following claims for this treatment: First, if instituted early, it will, in the majority of cases, arrest the disease, and rid the vaginal canal of gonococci in a shorter period of time than any agent now at our command. The drug will accomplish this in from four to six weeks. Second, therefore if used early it will, I believe, prevent invasion and subsequent disturbance of the deeper pelvic organs. Third, by its active germicidal influence exacerbation from latent glandular infection would be uncommon.

* See page 620.

Fourth, this agent is also of value in treating infection of the lower genital tract due to infections other than those caused by the gonococcus. Dr. Hartz cannot be criticized for limiting his observations to the study of smears. This method, I feel, is satisfactory and almost of as equal value as a culture. This latter method of study is almost impossible because of the difficulty in growing the gonococcus outside of the body. I feel that Dr. Hartz deserves credit for bringing this subject to our attention and for placing his observation on a scientifically proved basis, and for adding to our efficiency the treatment of gonorrhea in women. From personal knowledge I believe his method is the most valuable of any previously used.

Meeting of December 4, 1913.

The Vice-President, COLLIN FOULKROD, M. D., in the Chair.

DR. REUBEN PETERSON read a paper on

THE ROLE OF ABDOMINAL CESAREAN SECTION IN THE TREATMENT OF
ECLAMPSIA.*

DISCUSSION.

DR. EDWARD P. DAVIS.—We have all listened with great pleasure and profit to Dr. Peterson's able and instructive paper. This is encouraging because it shows the improved results obtained by early operation and improvement in operative technic. It emphasizes the fact that to be successful Cesarean operation must be largely elective, and certainly without many previous examinations and vaginal manipulation.

Dr. Peterson's paper, however, is written from the standpoint of the operator and the consultant, rather than from the standpoint of the obstetrician. He shares in a common misapprehension, namely, that eclamptic convulsions are the important and dangerous element in the toxemia of gestation. When we remember that cases sometimes pass through eclampsia and recover without the interruption of pregnancy, and go on to full term with the birth of a living child, we see that eclamptic convulsions are not necessarily fatal to mother or child, and that they do not inevitably terminate pregnancy. Furthermore the number and severity of eclamptic convulsions is not an infallible index of the severity of the case. We sometimes see patients die after one or two average convulsions, and others recover after from fifty to one hundred or more convulsions. It is unfortunate that the term "eclampsia" is used for the toxemic condition, which is clearly the important and dangerous element. It is true that many cases are not seen until the convulsions occur, but this number is growing smaller because more patients have intelligent care during pregnancy and the symptoms of toxemia are better known.

The treatment of toxemia is the important element in cases of toxemia culminating in eclampsia. Eclampsia itself is a conserva-

* For original article see page 581.

tive process on the part of nature to bring about lowering of pulse tension, excretion and secretion, and often the expulsion of the fetus.

When we consider this fact and the improvement in the results of Cesarean section on cases which have not been subjected to frequent examination and manipulation, which Dr. Peterson's paper shows so well, we must conclude that an improvement still further will lie in the direction of elective operation. This operation must be elective in two senses: First, no vaginal manipulation or frequent examinations must have been made; and second, the indication for operation must be the toxemic condition present and not the occurrence of convulsions. I am aware that on the latter point we are met with difficulty in diagnosticating the degree of toxemia present, but with patients under observation by close watching of suspected cases, I believe it possible to bring this about. As the treatment of toxemia is the important element, it will be necessary to deliver but few patients by Cesarean section. But when the treatment of toxemia fails, prompt delivery by elective operation should give the best results.

This treatment of toxemia in the present stage of our knowledge is most successful, when it consists of bleeding followed by intravenous saline transfusion, lavage of the stomach followed by the administration of calomel and soda, and frequent and copious lavage of the intestine. I have come to use the hot pack much less frequently and to avoid the administration of drugs which depress the circulation and favor the occurrence of pulmonary congestion. We must keep in mind that toxemic patients die most frequently with pulmonary edema, dilatation of the heart, or gangrenous pneumonia, and that our treatment should not be such as to favor the occurrence of these complications. Cases of severe toxemia are hospital cases because they are critical and demand the close watching and operative treatment which hospitals give. The decision that the patient is in a toxemic condition of danger is made by detecting great alterations in pulse tension, continuous and profound disturbance of nitrogenous metabolism, disintegration of blood corpuscles, as shown by examination of the blood and the disturbance of the central nervous system. In the treatment of this condition, eliminative treatment comes first, and operative treatment comes second. The success obtained by Stroganoff by purely eliminative treatment, and Zweifel's good results in the use of bleeding and transfusion, cannot be overlooked in studying this question. The copious use of anesthetics to check convulsions and the free employment of narcotics I believe to be exceedingly dangerous and to be avoided.

Dr. Peterson in his paper rather encourages the performance of Cesarean section and other operations in private houses. The tendency at present is to multiply hospitals, and in the long run I believe that these patients do best in hospital. Those who build up a consulting practice in obstetrics, if they have not abundant hospital facilities, must be able to improvise a hospital in the house

of the patient. This requires a portable operative outfit and trained assistance.

As regards the choice of operation when operation becomes necessary, at or near term, abdominal Cesarean section is certainly safest. In the earlier months with a dilated or dilatable birth canal, vaginal Cesarean section may be useful.

I cannot agree with Dr. Peterson in his classification of the children born in eclampsia by Cesarean section. Because a child lives one hour after delivery he must not infer it will survive the mother's toxemia. We have seen children die two weeks after birth from toxemia with convulsions, and we have delivered a vigorous well-developed child by postmortem section from an eclamptic mother, giving the child a wet-nurse and placing it under the most favorable conditions for life, to be disappointed by its death two weeks after birth from eclamptic convulsions.

I may summarize what I have said by a concrete example, which I intended to send to Dr. Peterson for his statistics. A primipara, aged twenty-two, was admitted to the Philadelphia Hospital in my service, pregnant at term, having eclamptic convulsions. She was evidently highly toxemic, the cervix admitted but one finger and was little shortened, the membranes were unruptured, there were very feeble uterine contractions. The patient was treated by stimulating elimination in the manner described. This produced no essential improvement and her condition of stupor with stertorous breathing and convulsions continued. She was delivered by abdominal Cesarean section of a living child, which was immediately given to a wet-nurse. Two weeks after operation the mother was permitted to nurse her child. Mother and child left the hospital, the mother nursing the child, six weeks after operation, in good condition.

I have followed Dr. Peterson's paper with great interest, differing from him in some things, and agreeing with him in most things. It would be impossible for me to differ from him radically in any thing.

DR. ASA DAVIS, New York.—I am not particularly well prepared to speak on this subject as to statistics. I feel much as Dr. Norris does about statistics, that we cannot draw too definite conclusions from them. There are many factors operative in statistics—the different methods of the different operations, different experience of operators, different environment of patients, etc. I also believe that we can do a great deal in the treatment of toxemia before the cases go to eclampsia, and I believe that along that line our progress will be made. It is a rather serious reflection on us that so many cases are allowed to drift into the eclamptic state. We do not know the origin of the toxemia but that it is coincident with pregnancy. The question is not so much to put something into the patient, but to get something out. All the channels of waste should work "over time" as it were and the patient should not be overfed. If in spite of precautions the patient develops eclampsia, I believe we should save the mother and not the child. Many of the cases

coming to us in our hospital service come too late and we save what we can out of the wreck. In my experience the abdominal operation is the safest and less shocking way of delivering these people. The operation can be done more quickly and with less shock and less discomfort to the mother than by the vaginal route.

The statement regarding the convulsions does not meet the situation to my mind. In one case in which there had been one convulsion the patient was delivered in an hour but died on the table. On the other hand a patient had 100 convulsions and recovered. I think it is wrong to take the number of convulsions as an indication of the seriousness of the condition. We may have all the other symptoms of eclampsia without the convulsions. The question of whether the child living a few hours should be counted has already been brought up. In one case in which there was toxemia but no convulsions labor was induced. The child was vigorous and the mother heard it cry from a distant room. Three hours afterward the child had a convulsion and died. The mother recovered without a convulsion.

DR. RICHARD C. NORRIS.—I have listened with a great deal of interest to Dr. Peterson's paper, and as Dr. Davis has said, I find it very difficult to differ with Dr. Peterson radically. I do feel, however, that there are some points upon which we should take issue. We must know more about eclampsia, its pathology and its etiology before we can draw hard and fast rules for its surgical treatment. The mortality of 25 per cent. is not one to be particularly proud of. In Dr. Peterson's closing remarks, every sentence, if you will analyze them carefully, as I did as he read his paper, draws the limitations about his arguments for Cesarean section more and more and comes nearer and nearer to my position in this matter. With our present knowledge we are not justified in saying that every woman threatened with convulsions, or who may have had one convulsion, must be delivered by abdominal or vaginal Cesarean section. We must learn more about the disease so that we may limit the cases in which this aggressive treatment is required. I doubt not that some women subjected to this aggressive surgical procedure have been helped over the border line into the next world and that the mortality of that particular class of cases has been added to by the surgery directed to the toxemia. I doubt not that some patients whose toxemias would stand the surgical operation have died because they have not been operated upon. There, it seems to me, should be the opportunities for future study. Can we so draw the limitations around groups of cases that we can say, this type of case must be operated upon; that type will get well without operation; and in another type of cases a good operator will increase the mortality. That, I take it, is the problem before us in the future.

Now, I have been opposed to rapid, aggressive, surgical intervention in eclampsia, but one man's experience is too small, as the Doctor has said, from which to draw conclusions. From my own personal experience I would feel I were acting in an unworthy

manner to do a vaginal or abdominal Cesarean section upon every woman who comes into my hands who has had one convulsion. In my own personal experience with treatment along other lines my mortality has not been 25 per cent. We cannot help but be influenced by our own experience. We are ready to receive the experience of other men, and here to-night, I frankly say that I believe the surgical indication for the treatment of an eclamptic case or a toxemic case depends largely upon our study of that individual case as to the grade of toxemia and the condition of the woman's birth canal. These studies will help us to decide how rapidly we must deliver her. Dr. Davis advises care of the patient during pregnancy and resort to eliminative treatment with which we all agree. I cannot agree with his immediate Cesarean section. I claim that by induction of labor at a sufficiently early period we can accomplish as much and more safely than by abdominal Cesarean section. We must be on our guard. Who can say that this particular patient will have a convulsion within a week or two weeks or within twenty-four hours. We have all the tests of the laboratory at our command and yet we have seen the most grave cases go through without a convulsion and the child live and those without grave symptoms will have the storm strike them and lose their lives. The occurrence of one convulsion does not measure the gravity of a case. We cannot determine our surgical treatment until we know more about this disease. Statistical studies are worthless, I care not how carefully they may be studied. So far as my own experience is concerned, I look upon eclampsia as a disease in which we must try save the mother's life. We have no time to haggle over the infant's chances. Who can say whether the toxemia in the woman is sufficient to destroy the infant's life. The infant's life, as in placenta prævia, must be discounted. So far as my judgment and experience go we should attempt to prevent rather than to cure and until we know more of this disease the crux of the whole matter is that the case should be studied through pregnancy, bringing the laboratory to our assistance, and that when we have a toxic patient who is drifting toward the danger zone we should abandon hope of saving the infant, end the pregnancy, and save the patient for future pregnancies.

For this early interference I can see very little use for vaginal and less for abdominal Cesarean section.

For the neglected cases, thrown into our wards often overwhelmed, very many will die no matter how treated. A few of these neglected cases, carefully studied, will justify major surgery. I had hoped that Dr. Peterson's statistical study would help us recognize that class of cases but it has not helped me in that respect, and it has not convinced me that I should deliver all my cases by Cesarean section.

DR. J. O. POLAK, Brooklyn.—I think we are all agreed on the point that the treatment of these toxemias should begin before the convulsions occur. If I understand Dr. Peterson's paper his contention is for the treatment of the toxemia after the convulsion

has occurred. If I am correct in my understanding, he has tried to prove, and has succeeded in proving to a very great extent, that the delivery in these cases where vaginal examinations have not been made after the convulsion has occurred, should be by the abdominal route, and that the statistics are better than in the expectant plan of treatment. I think we are all agreed upon the one fact that, if we can treat these toxemias beforehand, watch our patients up to the preeclamptic stage and then induce labor, the method is ideal. My experience, however, is that the patients are brought into the hospital in the convulsion. In such a case our method of treatment is the emptying of the uterus. Now what determines how we shall empty the uterus? The degree of toxemia, the condition of the woman's soft parts, the period of her gestation, and the condition of the child will determine this. We believe firmly in vaginal Cesarean section up to a certain definite point. I cannot do a satisfactory vaginal Cesarean section after the eighth month without doing very considerable trauma to the uterus. On the other hand, we have found since Dr. Peterson has stimulated us in this direction, that we can do an abdominal Cesarean section on a viable child, and so far in my limited experience of four cases, we have had the same happy results as Dr. Davis spoke of in recovery of mothers and children. No matter, however, by what method we deliver the patient, as has been stated the operation does not cure the toxemia. Each case must be followed by rational eliminative treatment. This is not by drugs, but by phlebotomy, packs, hypodermoclysis, infusion, etc.

It has been a great privilege to have had the opportunity to hear this paper and to participate in the discussion.

Dr. Peterson's paper:

DR. JOHN A. MCGLINN.—It has been a great pleasure to have heard Dr. Peterson's excellent paper. Those of us familiar with his writings on vaginal Cesarean section knew that we would have a rare treat to-night. The paper is largely a statistical one based on a comparatively few cases. I feel that there is danger in drawing definite conclusions from statistics as here presented. I agree with Dr. Norris, that in a study of this character, that it is necessary to know something of the individual cases making up the series, before we would be justified in drawing definite conclusions. My personal experience in abdominal Cesarean section for eclampsia has been limited to one case. That patient died but the circumstances were such that I would not hesitate to do the operation again if the proper case presented itself.

The proper treatment of antepartum eclampsia is a broad one and I do not believe that the question can be solved entirely by statistics. The treatment must depend upon the study of the individual case and the judgment of the obstetrician as to the best method of procedure in the individual case to solve the problems presented. In some cases it is better not to attempt to empty the uterus at once. In others it is best to interfere but the method of operation will depend upon the problems presented in the in-

dividual case. In the main I believe that if it is necessary to empty at once, the vaginal route is safer than the abdominal. That the mortality has decreased in the last decade after abdominal section is due I believe to the better selection of cases and the increased skill of the operators.

As pointed out by Dr. Davis the pregnant woman should be studied from the beginning of pregnancy instead of waiting until a calamity has occurred before attempting to outline the proper treatment. If the general practitioner would wake up to the fact that there is a possibility of every case being an abnormal one, and study the case from the beginning, he would be well repaid for the extra work entailed.

DR. PETERSON, closing.—I regret that my statistical work during the past three years has gone for naught, as surely would be the case if statistics are of no value. It is rather amusing to hear someone rail against statistics and then in the next breath speak of his own experiences. What are statistics if not a record of experiences? One may do as he pleases with these records, that is, he may draw his own conclusions. For example, you may draw your own conclusions from these 500 cases of abdominal Cesarean section for eclampsia. Even Dr. Norris, in spite of the fact that he thinks statistics are of no value, when confronted with a case of eclampsia with a rigid cervix, will of necessity be obliged to remember the statistics I have quoted this evening. Statistics certainly have been of value in the radical operation for cancer of the cervix in that they have shown that by experience the mortality can be reduced from fifty to ten per cent.

I agree with what Dr. E. P. Davis has said, but my paper was not upon the toxemia of pregnancy where there have been no convulsions. A patient who has had one or more eclamptic convulsions may not be as badly off as a toxemic patient without convulsions but there must be some standard by which we group the cases, and I have chosen this as being where there has been at least one convulsion.

Like Dr. McGlinn my own mortality in abdominal Cesarean section in eclampsia has been one hundred per cent., for I have operated but once and the patient did not survive. Although I have seen many cases of eclampsia, I have judged other methods preferable except in this one instance. In this particular case, the indication for the abdominal route was a previous pelvic inflammation, which prevented the drawing down of the cervix. The uterus was emptied without an anesthetic so deeply toxic was the patient. The latter died, not because the uterus was emptied but in spite of it.

Some one asks, if emptying of the uterus be the right treatment, why do the convulsions continue after the uterus is empty? The answer is that the convulsions continue in spite of the relief afforded by the operation, so deeply toxic is the woman when the uterus is emptied. We see the same lack of reasoning when patients die after other operations. We usually go to some trouble to explain that the patient died—not from the operation but in spite of it. Had the relief been given earlier the story would have been different.

Until I have a better guide for interference I shall judge of the degree of toxemia by the convulsions and because a woman is worse off after ten than after one convulsion, I shall deem it my duty to empty the uterus just as quickly as possible after the first convulsion, unless she be in labor and nature is doing the work satisfactory.

As I have said in my paper, it is very difficult to speak accurately about fetal mortality in eclampsia. It is perfectly true that a child which lives an hour may subsequently die of eclampsia. But the same thing might be said of a day or five days. Some standard had to be adopted and I have chosen that most frequently used by accurate statisticians. Please bear in mind that I am not here to make a plea for abdominal Cesarean section for eclampsia except under certain conditions when the operation is indicated. I have simply submitted certain figures for your consideration. If they be accurate, and I think they are, they are at least a slight contribution to the subject of the operative treatment of eclampsia. I am aware, as I have said, that 25 per cent. mortality in eclampsia is not particularly low. But when the abdominal operation is performed only in clean cases and when no time is lost but the operation is performed as soon as possible after the first convulsion, the present mortality from this particular operation will be greatly reduced.

TRANSACTIONS OF THE ALUMNI OF THE SLOANE HOSPITAL FOR WOMEN.

Stated Meeting, January 23, 1913.

The President, DR. A. W. BINGHAM, in the Chair.

DR. H. P. DEFORREST reported a case of

THYMUS DEATH IN A YOUNG INFANT.

The history of the case was as follows: The patient had been operated upon three years before the delivery of her first child, the appendix and adherent right tube and ovary having been removed. The uterus developed irregularly with the fundus in the right iliac region. The presenting part during the last three months was always a foot, which could be plainly felt through the vagina. When labor came on it was necessary to complete the same by manual dilatation with a difficult extraction of a child that weighed over nine pounds. A fracture of the neck occurred which was subsequently demonstrated by an x-ray examination. The woman subsequently became pregnant again and was extremely anxious to have a living child. As pregnancy advanced, the uterus did not remain in the deflected position noted in the first pregnancy. Toward the end of term, the breech presented and remained so, the head being felt under the liver on the right side. The patient was twenty-seven

years old, and the question of doing a Cesarean section was urged upon her by friends, and seriously considered both by the husband and herself. My own feeling about the case was that everything should be done to secure a living child but that inasmuch as I had my hand in the uterine cavity at the time of the previous labor and knew that while the antero-posterior diameter was less than normal, that it could nevertheless allow a 5 or 6 pound child to pass, I was inclined to believe that it would be better to induce labor before term, at about the eighth month. The patient was seen by Dr. Cragin in consultation who advised to have the woman sent to a hospital where, in case a Cesarean section was necessary, it could be done as an emergency operation. I attempted to secure a vertex presentation of the child by attempting external version about every three days. This could be done without difficulty but a return to a breech presentation invariably recurred. The patient entered the Post-Graduate Hospital when her pregnancy was calculated to be about eight months and a week. An estimation of the occipito-frontal diameter of the fetal head was made through the abdominal wall and showed a measurement of 11 cm., which proved to be within 0.5 cm. of the actual measurement made after birth. The cervix was dilated and a No. 3 Voorhees bag introduced. An external version had been done and the child held in position while the membranes were ruptured. A large amount of liquor amnii drained away and the labor continued fairly rapidly. The fetal heart during all this time was perfectly normal, but the head did not engage or advance. The child turned back spontaneously although an effort had been made to keep it with the vertex below, and on examination a breech was found to be presenting. About fifteen minutes later, while preparations were considered for Cesarean section, the baby was being born spontaneously without any efforts at extraction. The heart continued to beat for twenty-five minutes and artificial respiration was kept up for forty minutes. The color remained good but the heart gradually stopped beating and notwithstanding every effort, no air could be made to enter the lungs. Autopsy showed a complete atelectasis of both lungs and inflation of the same through a tube was found to be impossible. A tracheal obstruction was found to be present, due to an enlarged thymus gland. The trachea was opened and found to be quite flat so that the anterior was compressed against the posterior wall. A canula was then passed below the obstruction, and through it the lungs inflated without the slightest trouble. The atelectasis which existed was not therefore due to the lack of normal development of lung tissue, but to the mechanical obstruction produced by compression of the thymus by an enlarged gland. The foramen ovale was also widely opened. The mother made an uneventful recovery.

DISCUSSION

DR. G. L. BRODHEAD said: The external pelvic measurements and the measurements of the fetal head taken through the abdominal

wall indicated in this case that there would probably be no difficulty in the passage of the head through the pelvis, but after the child was born I made a vaginal examination and found that while there was plenty of room for the child's head to pass the promontory, the sacrum was very sharp, making it difficult for the head to engage readily. In other words, there was more difficulty in engagement than would have been the case with a less marked promontory. As soon as the head slipped to one side of the inlet, it showed a tendency to go further out of place. The delivery was easy and there seemed at the time to be no reason why the child should not have been born in good condition.

DR. E. B. CRAGIN said: There is just one point which it seems well to emphasize, and that is the value of an autopsy in these cases of sudden death, soon after birth. Here was a family that was extremely anxious to have a living child. Although they may not have criticized any one of the attendants or consultants, they would have been very apt to, and would have wished that they had had a Cesarean section done, unless the autopsy had proven exactly the cause of death. A great many of such sudden deaths in infants are associated, as you know, with an enlarged thymus, and it seems of value that we should all bear in mind the possibility of that cause of sudden death and have it verified, if possible, by autopsy, so that the parents may be relieved and feel that everything was done that could be done, and that the obstetrician was not to be blamed for the result. Dr. DeForest, as well as the rest of us, are to be congratulated that we had an autopsy in this case.

Dr. DeForest, in closing, called attention to the pink color of the child, which in spite of absolute lack of aeration showed no tendency to cyanosis.

DR. RALPH W. LOBENSTINE presented

TWO CASES OF INTRAUTERINE DEATH OF FETUS.

CASE I.—Mrs. B., para-iv, was referred on December 22, 1913, for diagnosis as to her condition as well as for advice as to further treatment. The patient was about six and one-half months pregnant. Some five weeks prior she developed severe pain in the abdomen over the uterus, especially on the left side. At that time there was no sign of collapse. She was sent to St. Luke's Hospital and was kept there for ten days under observation. At the end of that time she left the hospital as the pain had practically ceased. Afterward there was a complaint of constant discomfort in the uterus with not infrequent mild, cramp-like contractions. On December 6, about two weeks after leaving the hospital, she was seen by another physician who stated that the child was alive and apparently in good condition. At the time of her visit to my office she claimed not to have felt life for about two weeks. She felt sick and appeared to be suffering from some form of toxemia, her temperature was 99.4° F., no fetal heart could be heard. The uterus was somewhat smaller than it should have been at this stage of pregnancy and had lost its normal elasticity. The cervix was soft, one finger dilated, and there

was a slight odor to the vaginal secretion. There was no evidence of liquor amnii. The urine contained a trace of albumin, a moderate amount of indican, but no acetone. I referred her to her physician with the suggestion that she be delivered on the following day on account of the presence of the severe infection. The patient was not willing to have labor induced immediately but was delivered soon after. During the labor her condition grew very much worse. The fetus was so badly macerated that it was removed with difficulty and the odor from the same was extremely bad. Soon after delivering the fetus a considerable amount of gas escaped from the uterus. The patient failed rapidly and death occurred two days later. The case is unusual because of the development of a profound sepsis with unruptured membranes before the onset of labor. It also illustrates the danger of delay in emptying the uterus after the death of the child. At the time of the patient's entrance to the hospital she was evidently suffering from a retroplacental hemorrhage. While this did not actually kill the child it undoubtedly marked the beginning of the process. Death of the mother could probably have been prevented had labor been induced at the onset of the toxemia.

The second case was one seen in consultation a short time after the one just reported. A profound toxemia of the mother followed the intrauterine death of the child in contrast to the specific infection in the previous case. The patient Mrs. H. P., para-i, was about six and one-half months pregnant. She had apparently been well up to within four days before Dr. Lobenstine saw her, at which time she developed a rapid and fairly severe toxemia. Despite active treatment by her physician she did not improve and was losing ground. At the time of her visit she had not felt life for four days but was positive that life had been active up to that time and her physician verified this statement. The patient presented the picture of a rapidly developing toxemia of pregnancy, and she was probably more ill than she seemed. The urine showed a large percentage of albumin, casts of all varieties, increased indican and acetone, and a disturbed nitrogen parturition. Immediate induction of labor was advised and the patient was delivered the next day. In this instance also the fetus was so macerated that delivery was difficult. There was no odor or other sign of infection. The placenta was very large, greatly degenerated and presented the appearance of a syphilitic organ, although it was not. Convalescence was slow but satisfactory. This case is instructive because it illustrates one of the effects of severe toxemia of pregnancy upon the fetus, which in this instance was shown by the rapid and extensive maceration which otherwise rarely occurs so quickly. Another point of interest, is that, with the death of the fetus a true toxemia of pregnancy usually shows tendency to improve, whereas in this case the opposite occurred.

DISCUSSION

DR. O. P. HUMPHSTONE said: These cases are interesting to me because of five others observed recently. In three of them there was

death of the fetus and the placenta became more or less putrified in the uterus. In two others, the placenta was left in the uterus to be delivered spontaneously, as advised by certain German obstetricians. I am not able to prove the following contention but I believe that a decomposing placenta causes the production of some ferment which acts on the liver. Practically all of these five cases which I referred to, showed evidences of jaundice and presented subnormal temperature, a good heart action, although the pulse at the wrist was very weak, suggesting a tremendous lowering of the blood pressure from some active poison in the circulation. Although I have not been able to obtain a liver from such a case, yet I believe that where the placenta is decomposed, something is formed which acts in just the same way as the poison in other cases of toxemia. Suggestive of this, are Rongy's results with the use of placental extracts in the treatment of eclampsia.

DR. E. B. CRAGIN asked Dr. Humpstone whether he did not think it possible that the jaundice in his cases was simply the result of the toxemia in these women and that the condition of the placenta was secondary to the general toxemia which they had to start with.

DR. G. L. BRODHEAD asked Dr. Lobenstine if the urinalysis of the urine in his first case showed any signs of degeneration of the liver or kidneys.

DR. E. B. CRAGIN said: It has always seemed very difficult, when any one feels the responsibility of teaching, as a good many of us do here in this room to-night, to give a rule that he feels is perfectly safe for pupils or young men to follow, namely that a uterus should be emptied soon after the fetus dies. The rarity of the cases that Dr. Lobenstine presented to-night shows that as a rule the uterus will empty itself of the dead fetus without harm. We admit the possibility of some of them getting infected *in utero*. All of those who have done Cesarean sections after long labors, even if no rent in the amniotic sac has been observed, have often noticed a little odor to the amniotic fluid, proving that a certain number of cases will become infected before the apparent rupture of the membranes. As already stated, many of the uteri with the fetus in, will empty themselves spontaneously. However, it is often extremely difficult to tell positively along in the middle of pregnancy whether a fetus is alive or not, hence I feel just like giving a word of caution, not to be in too much of a hurry to empty the uterus in a pregnancy where you "think" the baby is dead. I have had quite a number of patients sent to the hospital with the statement that the fetus was dead—much earlier than Dr. Lobenstine's cases, about five or six months. I will admit that I have not been able to get the sounds of the fetal heart at first, but in some of them after watching for a few days or a week, signs of life in the fetus become evident. If we had emptied the uterus at once we would have sacrificed a life, which was saved by waiting. I simply want to make this suggestion, that if the case is carefully watched for temperature, pulse, and evidences of toxemia, we need not be in too great a hurry. It is necessary to be cautious, however, and during that delay the greatest care must be

taken in watching the general condition of the patient, with her elimination in every avenue.

DR. GEO. W. KOSMAK presented a case of

CESAREAN SECTION FOLLOWED BY HYSTERECTOMY FOR DYSTOCIA
DUE TO A FIBROID IN THE LOWER SEGMENT.*

DR. DANIEL ROE AYERS presented the paper of the evening, entitled

CARCINOMA OF THE CERVIX AT AN EARLY AGE.

Carcinoma of the cervix occurring in women under thirty years of age is not common. Cases occurring under twenty years of age are sufficiently rare to merit some comment.

In some parts of the body, the gastrointestinal tract, for instance, carcinoma at an early age is quite frequently met with. Cheney in Douglas', "Surgical Diseases of the Abdomen," reports 150 cases of carcinoma of the stomach: twenty cases were under thirty years of age, thirteen cases were between ten and twenty years of age, six cases were under ten years of age; a total of over 12 per cent. under twenty years of age. The Mayos report 126 cases of carcinoma of the stomach occurring in the five years previous to 1908. Four per cent. of these were under thirty years of age. Carcinoma of the ovary occurs before puberty. The statistics of carcinoma of the cervix do not show a large number of early cases. Cullen in "Cancer of the Uterus" gives as his earliest case, a patient of thirty-one years.

Lewers in "Cancer of the Uterus" reports 100 cases from the London Hospital and private practice. Between twenty-five and thirty years there were no cases; between twenty and twenty-five years there were two cases. There were none under twenty years of age.

Roger Williams in "Uterine Tumors," reports 500 cases, the youngest being twenty-two and a quarter years.

Gusserow collected 3385 cases from English and Continental literature. There were only two cases under twenty years.

Sinclair in "Playfair and Eden's System of Gynecology" commenting on this report says, "we may fairly presume that these were cases of sarcoma." Later in the same article Sinclair states that sarcoma of the cervix has been found in the child.

The most recent compilation of figures available were those of McGlenn (*New York Medical Journal*, July 31, 1909). He collected 2291 cases. Seven of these were under twenty years of age and forty-nine between twenty and thirty years of age. Oskar Müller found no cases under twenty years of age in a series of 577 cases. The youngest case on record was reported by Ganghofner in 1888.

*This case is reported in the Transactions of the Obstetric Section, N. Y. Academy of Medicine, January Meeting.

The patient was eight years old but Williams believes that the malignancy of the growth was never clearly proven. The earliest authentic case of carcinoma of the cervix was reported by Schauta and Glatzer. The patient was seventeen years of age. The growth was adenocarcinoma.

Considering then the unusual occurrence of carcinoma of the cervix under thirty years of age and the rarity of the occurrence under twenty years, it may be of interest to analyze the first twelve cases of this disease admitted to the Sloane Hospital for Women. Six of the cases occurred in women over forty years. Four were between thirty-one and thirty-eight. One was twenty-seven and one seventeen years old. The three youngest were multiparæ, two being unmarried, one of whom was undoubtedly a virgin. The patient of twenty-seven was a colored woman, married. The history dated back about six months, the symptoms being bleeding and a foul discharge. On examination the cervix appeared as a crater of necrotic tissue, friable, bleeding easily, and foul. The uterus was not freely movable and there was infiltration of the uterosacral ligaments. The condition was considered to be inoperable and the treatment consisted in cauterizing the crater. The patient was discharged after convalescence from the operation, in July, 1911, and has since been lost track of.

The second case, the girl of seventeen, being as young as any authenticated case that could be found in the literature, will be described more in detail. She was admitted to the Sloane Hospital for Women on April 28, 1912, as the patient of Dr. E. B. Cragin. She was unmarried and had never been pregnant. Previous history unimportant. Family history, parents living and well. Menstrual history began at thirteen years, regular, flowing four or five days. Present history began a few months before admission, when the menstrual periods became prolonged and the bleeding more profuse. At first rest and the administration of ergot were effectual. Later the bleeding became uncontrollable. A vaginal examination was then made the surprising result of finding a large cauliflower growth on the cervix. One can easily appreciate why there was any hesitation in making an examination, and compared with many cases, the delay was inconsiderable. The growth was removed for examination. It so happened that the pathological report was not convincing as to the exact nature of the growth. Two different sections of the specimen gave absolutely diverse pictures; one obviously malignant, the other apparently benign. Because of this uncertainty it was thought best to remove another specimen, and if malignancy was undoubted, the patient could be operated on accordingly. So on the day after admission, the patient was put under general anesthetic. Examination at this time showed a raw area at the junction of the cervical and vaginal mucous membrane. The uterus was freely movable, there was no infiltration of the uterosacral ligaments and the adnexa were negative. Dr. Cragin performed a circular amputation, and the specimen was examined as rapidly as possible. The report was carcinoma of the cervix. The patient was again put under an anes-

thetic and a radical operation was done by Dr. Cragin. The technic usually employed was followed.

The vagina was cleansed and the patient put in the Trendelenburg position. A median suprapubic incision was made and the intestines packed off. As much as possible of the broad ligaments was removed, the ligatures being passed distal to the tubes and ovaries. The ureters were dissected out and the uterine arteries secured in ligatures as far distal as possible. The bladder was pushed well down in front and Wertheim clamps placed on the vagina, which was cut across at the junction of the upper and middle thirds. Thus the uterus, the stump of the cervix, the tubes and ovaries, were removed with the upper third of the vagina. The pelvis was drained. There were no enlarged lymph nodes. The patient made a good recovery and was discharged in the fourth week after operation. At the present day she is living and well. Aside from the extreme youth of the patient, there are other points that may be of interest. First, the pathology.

The report from the amputated cervix reads as follows: "Cervix of the uterus, vaginal portion, one part thicker and contains rounded mass, but nothing definite can be determined macroscopically. *Microscopical.* (1) "At the point where squamous and columnar epithelium should unite, there is a loss of tissue, with dilatation of blood-vessels and moderate infiltration of tissue near the denuded area. From the side covered by squamous epithelium there extend down into the musculature masses composed of cells of the squamous type, the result of abnormal cell proliferation." (2) "The musculature is being invaded by cell masses composed of large epithelial cells with large deeply staining nuclei. The cytoplasm is granular and stained somewhat, very much in contrast to the unstained cytoplasm of the cells of the squamous type. Some of these cell masses are arranged in acini, forming a single-layered wall around a mass of eosin-stained colloid material which is quite homogeneous in appearance. The general type of the new-growth of epithelial cells in the deeper portion of the cervix is that of an adenoma."

It can be seen from this why there was doubt as to the nature of the cauliflower growth originally removed. One part of the growth presented a mass of cells that gave the appearance of malignancy; the other part showed a growth that was adenomatous. The study of the amputated cervix showed both these elements present.

It is generally admitted that the younger the individual in whom carcinoma occurs, the more unfavorable is the outcome. It is nearly two years now since this patient was operated on, and fully that since the beginning of symptoms, and up to date there is no suggestion of recurrence. Therefore, it can be assumed with safety that the prognosis in this case is as favorable as in any that one ordinarily meets.

TRANSACTIONS OF THE NEW YORK ACADEMY OF MEDICINE.

SECTION ON OBSTETRICS AND GYNECOLOGY.

Stated Meeting, Held January 27, 1914.

DR. ASA B. DAVIS *in the Chair.*

REPORT OF TWO CASES OF ECTOPIC PREGNANCY. PRESENTATION OF PATIENTS AND SPECIMENS.

DR. ALFRED M. HELLMAN said that these cases were of interest because they entered the Lebanon Hospital the same day and because the specimens obtained from them were unusual.

CASE I.—This patient was thirty years old and her last period was ten weeks before she was admitted to the hospital. She had been married nine weeks. On January 3, four weeks before admission, she began to stain slightly and had cramps in the lower abdomen. This stopped but started again two weeks later; it then continued until the day of admission. At 8 A. M. on the day of admission she was seized with sudden dizziness, and blurring of vision, and she fainted for several minutes. The cramps in the lower abdomen were extreme; she had thirst, perspiration, pallor, and prostration. Her temperature was 97° F. and she was pulseless and very restless when he was notified of her condition over the telephone. When he arrived at the hospital he found the patient, a well nourished woman, apparently dying. A median incision under ether anesthesia and a saline infusion were all started at once. The left bleeding tube was easily found and tied; as a result of the removal of the intraabdominal tension and stopping of the bleeding, the patient's condition rapidly improved during the operation. The rupture in the tube was so close to the cornu of the uterus that it was necessary to resect a large fibroid. As it was impossible to arrest the bleeding from the base of the fibroid he did a simple typical supravaginal hysterectomy. The patient was returned to bed, given another infusion and stimulants, and the next day she had a temperature of 98.8° F. and a pulse of 120. She made a rapid and uneventful recovery and left the hospital about the sixteenth day.

The specimen was a uterus with multiple fibroids, the largest one arising at the left cornu and right next to the point of rupture of the ectopic.

CASE II.—This patient, aged twenty-six, was admitted with the following history: She had been married four years, had two children, the youngest eight months old. She had had no miscarriages. Her labors were uncomplicated. After her last labor amenorrhea persisted for six months. On November 10 bleeding occurred and

continued until her admission to hospital. On December 15, when riding in a street car she was severely jolted and thrown. Immediately she had severe cramps in the lower abdomen and vaginal bleeding. She was able to walk home and sent for a physician. She said that she had no fever and that the cramps lessened, but the staining continued. One week before admission the cramps again became worse and from then on defecation was extremely painful. She was admitted on January 3 with a temperature of 106° F., tenderness over the lower abdomen and exquisite tenderness and a rounded mass in the culdesac of Douglas. The temperature rapidly became normal, the pulse remained over 100, and four days later the specimen presented was removed and the patient made an uneventful recovery. The specimen was a distended tube which had ruptured along its upper border through the opening was closed by clots. The ovum was intact and adherent to the posterior wall.

A CASE OF REPORTED ADENOCARCINOMA CURED BY CURETTING.

DR. HERMAN J. BOLDT read this report. The patient had consulted him as she wanted to know whether a hysterectomy was necessary, because she had been told that she had cancer. After putting himself in communication with the pathologist, Dr. Boldt said he had failed to get a copy of his report, or the specimen, or the slides upon which the diagnosis had been based. Not finding, upon the most careful examination, the slightest subjective or objective evidence of carcinoma, he had proposed a curettage and an additional examination of the scrapings. About two weeks later, after the report on the examination of the second curetting specimens had been received, the slides of the first curettings were received and examined, and he was astonished to find an adenocarcinoma, far advanced, as was indicated by the slide on exhibition. On the second slide was an area of carcinoma not much resembling the character of the cancer observed on the first slide. A study of the sections failed to show a transitional stage. Other competent experts had also failed to find a transitional stage. All stated that it was not an early stage of adenocarcinoma. Therefore this case, considering all its features, must be considered unique, and the first operator was to be congratulated on being so singularly fortunate as to have, as seemed evident, the first case which had been cured of advanced adenocarcinoma by curetting for diagnosis. There had been a few cases of adenocarcinoma reported cured by curetting for diagnosis but they did not resemble this case. It was evident that the disease was not in the early stage; it had transgressed, as one of the sections showed, well into the muscularis. Whereas serial sections of the curettings obtained two weeks later from the same patient, and the scrapings were done very thoroughly, not missing any part of the endometrium, showed practically a normal mucosa. In order to illustrate how unusual this case was, Dr. Boldt submitted the

written reports from two pathologists, whose ability and competency could not be denied, Professor William H. Welch of Johns Hopkins, and Dr. Neujean, of the Practitioner's Laboratory, who had had experience under von Recklinghausen and Baumgarten, beside clinical experience as assistant in the leading gynecological clinics of Europe. Some other experts in pathology expressed the opinion that the case was so "unparalleled that it was more natural to suppose that a mistake had been made in the specimens, which might occur and

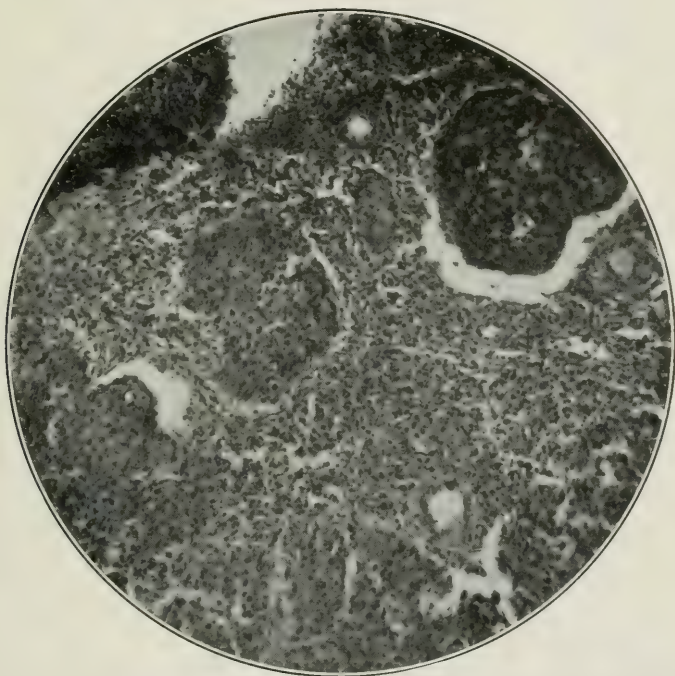


FIG. 1.—Curettings obtained by first operator showing alveolar cancer.

repeatedly had occurred, no matter how carefully laboratory work was conducted." But in this particular instance this seemed impossible from what the pathologist who examined the specimen claimed. Dr. Boldt recalled another instance, seen in consultation some seven or eight years ago, under somewhat similar circumstances. That patient was seen by the speaker three years later, and was in perfect health, despite the fact that her uterus had not been removed, because of Dr. Boldt's opposition, though it was asserted to be the seat of malignant neoplasm and that the patient would die if the uterus were not removed.

Although only a few weeks had passed in this last case, yet a most careful intrauterine exploration, made on January 20, revealed noth-

ing suspicious. If one could get a cure, judging entirely from the pathological reports, from an ordinary curetting for diagnosis, it would seem that those—and the speaker said he belonged to that number—who insisted upon the desirability of doing a radical operation, in the early stages of carcinoma of the uterus, were subjecting their patients to an unjustifiable risk as their conception of cancer of the body of the uterus was faulty, and they ought to remodel their therapy in instances of malignant disease of the body of the uterus.



FIG. 2.—Curettings obtained by Dr. Boldt two weeks later showing practically a normal condition.

Dr. Boldt then read the reports of the pathologists who had examined his scrapings. In summing up the result of his examination Dr. Victor Neujean wrote as follows: "The parts of the myometrium present in the sections show a normal appearance; the walls of the blood-vessels are, however, slightly thickened. The specimen presents the characters of a slight chronic inflammation which only interests the mucous membrane. The perfect maintenance of the glandular individuality absolutely excludes any suggestion of malignancy. The diagnosis would, therefore, be slight endometritis interstitialis and glandularis hyperplastica."

The report of Dr. William H. Welch stated that his findings entirely confirmed those of Dr. Boldt. Dr. Welch wrote "The scrapings

are so numerous and satisfactory for study that I should think that the diagnosis of adenocarcinoma could be excluded, as experience shows that when this is present even over limited areas it usually appears in curettings. "In concluding his detailed report Dr. Welch said, "I find no evidence of carcinoma or other malignant disease, nor indeed of other serious abnormality of any kind. The possibility of polypoid adenomata cannot be positively excluded, but there is no positive evidence of such condition." Dr. Boldt also read a subsequent letter written to him by Dr. Neujean in which he stated that he was pleased to confirm his opinion concerning the

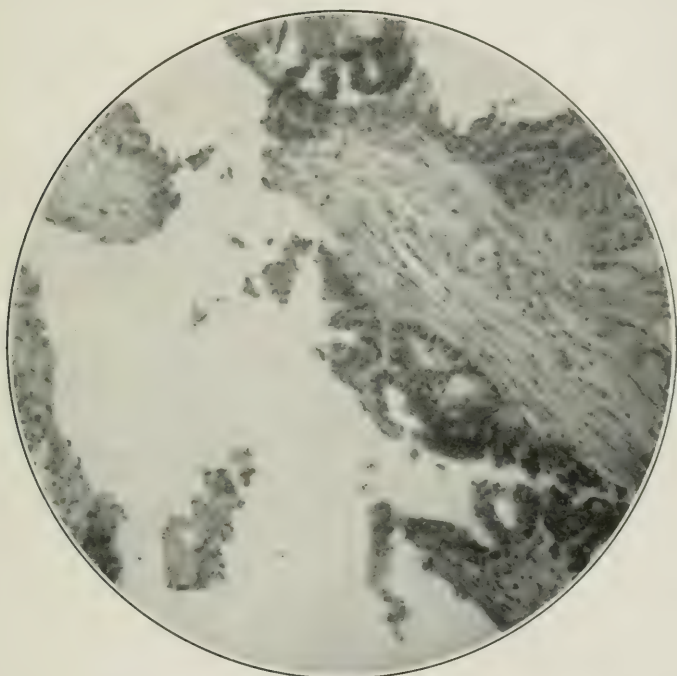


FIG. 3.—Curettings showing invasion of the muscularis by carcinoma.

curettings submitted, that the microscopical examination showed nothing pathological except a very slight interstitial and glandular endometritis. He stated furthermore, that in his opinion it was absolutely impossible that curettings, made some weeks previously to the specimen submitted, could have revealed any suggestion of a characteristic adenocarcinoma. If at the time of the first curettage there was uterine cancer, it was certain that some weeks later this diagnosis would have been without doubt confirmed both by the microscopical and the clinical examination.

DR. LOUIS J. LADINSKI said that the question of pathological diagnosis in this case would have to be settled by the pathologists.

He was glad that Dr. Boldt had reported the case in full, and that it would only be necessary for him to give the history of the case up to the time when Dr. Boldt had first seen the patient.

Dr. Ladinski said that he took exception to the reference made by Dr. Boldt to another case, seen some seven or eight years ago by him at Beth Israel Hospital with Dr. Ladinski, as being similar to the case just reported. In that case Dr. Ladinski advised an exploratory curettage on a woman who had aborted and who bled profusely and persistently, in order to ascertain whether malignancy were present, and if present, a hysterectomy was proposed. When Dr. Boldt made a digital examination of the uterine cavity, he did not think there was malignancy; a curettage was then done, and as the specimens examined showed nothing abnormal, a hysterectomy was not done. That case was not one of adenocarcinoma cured by curettage.

The case reported by Dr. Boldt was seen by Dr. Ladinski at his office for the first time on October 7, 1913. She was forty-seven years of age, had been married twenty-two years, and had never conceived. She had menstruated regularly every four weeks, from one to five days, until two years ago, when the menses ceased for a whole year. For the past year, however, she had bled irregularly on and off. She complained of no pain.

On examination the uterus was found somewhat larger than was to be expected in a woman who had never conceived and had begun the menopause two years ago. A small bleeding mucous polypus protruded from the os, which the speaker said he clipped off. He gave a very good prognosis and told her to return in a few days. As the bleeding continued in spite of several intrauterine applications of iodine, for five weeks after the removal of the polypus, curettage was advised and performed by him on November 14. He continually assured the patient that the bleeding was not caused by any malignant disease, even when he had removed the tissue from the uterus. He believed at that time the gross appearance was that of a degenerated polypus. Much to his chagrin Dr. Eli Moschowitz, the pathologist, reported that the scrapings showed adenocarcinoma. Dr. Ladinski said he then sent for the patient's husband and told him of the finding of malignant disease by the pathologist, and advised a hysterectomy. The husband said he would consider the matter for a few days as he wished to consult with his wife's sister. In a few days he took his wife home to recuperate for the operation. A day or so afterward a relative came and said they would like to consult Dr. H. C. Coe, and asked the speaker to accompany the patient. This Dr. Ladinski declined to do but gave her a letter to Dr. Coe together with a brief history of the case.

The patient then consulted Dr. Coe, who had concurred with him as to the necessity for hysterectomy. The patient did not return but went to Dr. Boldt.

The interesting feature of this case was the coincidence of mucous cervical polypus which marked the history and the clinical symptoms of what would otherwise have been looked upon as almost pathog-

nomonic of malignancy, so that the curettage was postponed for about six weeks. The lesson that this case taught was that, given a case with the suspicious history that this one presented, it was imperative to take nothing for granted, but to do a curetting for diagnostic purposes. Had he performed a diagnostic curettage when the patient came to him in October, she would undoubtedly have consented to a hysterectomy and would now be free from a uterus which was positively the seat of adenocarcinoma a few months ago, and should therefore be removed.

As an instance that a case of adenocarcinoma of the uterus could not be considered cured because the second scraping done two months after the first did not confirm the presence of malignancy, Dr. Ladinski made a supplementary report of a case reported before the Section on Obstetrics and Gynecology of the New York Academy of Medicine on May 25, 1911, and published in the *AMER. JOUR. OBST.*, August, 1911, p. 314.

Dr. Ladinski said he had recently investigated the circumstances of this case, and found that the surgeon who curetted the patient remembered having the scrapings examined and it was his own opinion and the distinct recollection of the family physician and of the patient who was still alive, and of her daughters, that the report was negative; and yet two months later she had to have her uterus removed for adenocarcinoma and only a small portion of the uterine wall was found involved.

DISCUSSION OF DR. LADINSKI'S AND DR. BOLDT'S CASE.

DR. ELI MOSCHCOWITZ said that in this instance a mistake arising from incorrect numbering of the slides in the laboratory could be excluded. The specimen could be definitely traced from the operating room to the fully prepared slide; moreover no case of adenocarcinoma of the uterus came to the laboratory for many weeks before and after this incident.

Dr. Moschcowitz furthermore wished to define what he understood by the terms "precancerous stage" and early "cancer". In the first place, he did not believe the term "precancerous stage" was justified. A tumor was either cancer or not cancer. He did not deny that there were predisposing conditions, but these are not cancer. Furthermore, he understood the term "early" cancer as signifying size rather than a precise microscopic picture. The microscopic unit of every variety of carcinoma is the same, whether the cancer is small or large in size. Dr. Moschcowitz therefore believes that it is impossible to determine from a given microscopic picture whether a cancer is in an early or late stage. Dr. Rubin had studied the question of early stages of carcinoma of the vaginal portion of the cervix and had found carcinomas perhaps no larger than the head of a pin in areas that appeared to be nothing more than erosions. These carcinomas had every microscopic characteristic of large carcinomas, the only difference being that the process was extremely limited in extent. The fact that Dr. Ladinski's specimen

showed extension into the musculature did not therefore necessarily prove that the carcinoma was "advanced." This extension into the musculature is demonstrable in practically every case of carcinoma of the corpus uteri; indeed Dr. Moschcowitz did not recall any case of carcinoma of the corpus uteri which was strictly limited to the mucosa.

There was only one conclusion that could be derived from the course of events occurring in Dr. Ladinski's case; namely that at the first curettage made by Dr. Ladinski the entire carcinomatous area was removed. It is a peculiar circumstance that in the past few months four cases of similar nature have been reported in the German literature (Hess, *Deutsche Medizinische Wochenschrift*, 1913, No. 22, "Heilung eines Falles von Carcinoma Uteri nach Probeauskratzung"). Von Hansemann in the same number reports two additional cases. Pryn, (*Deutsche Medizinische Wochenschrift*, 1913, No. 26, "Vollständige Entfernung eines Carcinoma Uteri durch Probeauskratzung.") Furthermore, many pathologists to whom Dr. Moschcowitz had spoken have related similar experiences, namely, that they had reported "adenocarcinoma" upon exploratory curettings, and examination of the uterus after hysterectomy showed no further trace of malignancy. Dr. Moschcowitz did not believe Dr. Boldt was justified in reporting the case "cured." Indeed he thought the case would be of even greater interest if reported three years from now.

DR. WILLIAM H. W. KNIPE related an instance of a woman who six weeks postpartum was sent to Bellevue Hospital. She was curetted and the scrapings sent to the laboratory. The report came back that adenocarcinoma was present. The patient was gotten in condition for an operation and hysterectomy was performed. The extirpated uterus was sent to the laboratory and the report from the pathologist stated that the organ was normal and that no evidence of adenocarcinoma could be found. This instance was cited as showing that the diagnosis made from the scrapings had been misleading.

DR. ARTHUR STEIN said that he had occasion to observe a similar instance about twelve years ago. In that particular case the probatory curettings showed microscopically a typical adenocarcinoma uteri. The uterus was then removed and a renewed microscopic examination of many serial slides from all parts of the uterus showed no signs of malignancy whatsoever. The findings were approved by the pathologist. Another similar case was reported in the *Centralblatt für Gynaekologie*, 1913, by an author whose name Dr. Stein could not remember and the findings were indosed by the well-known pathologist Prof. v. Hansemann. Dr. Stein agrees with Dr. Ladinski when he says, that in all cases where a diagnosis of malignancy was made the uterus ought to be removed, whether the case has been "cured" by curetting or not.

DR. HERMAN J. BOLDT, in closing the discussion, said that he had nothing to add about this case but that he remembered the case referred to which he had seen seven or eight years ago. A hysterectomy was to have been performed on a certain day and the husband

came to him and urged him to come and see his wife and advise in regard to the proposed operation. He at first refused saying he would only come on Dr. Ladinski's invitation. Somehow it was finally arranged that he should see the patient. Dr. Ladinski made the statement that he was going to do a hysterectomy as the condition was one of malignancy. The speaker said that from the clinical evidence he differed in regard to this diagnosis. There had been no profuse hemorrhage, only slight hemorrhage at intervals. The speaker suggested that Dr. Ladinski should do a curettage and not a hysterectomy.

DR. LADINSKI, in closing the discussion, said, in regard to Dr. Boldt's statement concerning the case referred to as occurring seven or eight years ago, he would like to ask Dr. Boldt whether scrapings had been made and whether a pathological diagnosis had been made before Dr. Boldt saw the case; furthermore, whether Dr. Ladinski had advised a hysterectomy when a microscopical diagnosis had not been made. Dr. Ladinski declared that it was quite impossible that he could have advised a hysterectomy for carcinoma without a laboratory diagnosis of the curettings. That was not his custom.

DR. H. J. BOLDT presented the pelvic organs of two patients upon whom he had formed

ARTIFICIAL VAGINA BY INTESTINAL TRANSPLANTATION.

In both instances the result was satisfactory, so far as the presence of a good sized vagina was concerned, and, because of the natural mucous membrane lining the canal, it is impossible for it ever to contract.

Whether, in the case of his patients, sexual intercourse will be satisfactory, he has not been able to determine; because in the first case, he was unable to trace the patient; and in the second case, the woman is not yet living with her husband, because he had left her on account of complete absence of the canal, and he has not yet returned to her.

The first specimen consists of a well formed uterus, a trifle thicker than normal and a trifle more globular. Its cavity is rudimentary; the adnexa are closely agglutinated to the body, and the ovaries are in a condition of cystic degeneration. The tubes are not to be seen. No histological examination has yet been made of this specimen.

The second case represents the pelvic organs from one side only. It was removed for histological study. It consists of a rudimentary uterus, a rudimentary Fallopian tube, with its fimbriæ spread over the ovary, which is of normal size.

"DR. HENRY D. FURNISS said that he had seen two instances of complete absence of the vagina, one of which had been operated upon. Two of these called at the clinic because they were contemplating marriage, and wanted to know if marriage would bring about the establishment of the menstrual function. In these two instances no evidence of any genital organs could be found. One of the three cases mentioned was operated upon, and an endeavor was made to line the

vagina with skin flaps, but the result was exceedingly unsatisfactory.

He believes that the method described by Dr. Boldt as used in his case is the one of choice."

DR. GEO. W. KOSMAK presented a

REPORT ON A CASE OF CESAREAN SECTION FOLLOWED BY HYSTER-
ECTOMY FOR DYSTOCIA DUE TO A FIBROID IN THE LOWER
UTERINE SEGMENT.

THIS case is reported as an instance of absolute dystocia due to a hard fibroid mass which occupied the greater part of the pelvic inlet. The patient was 33 years of age, married for the second time in

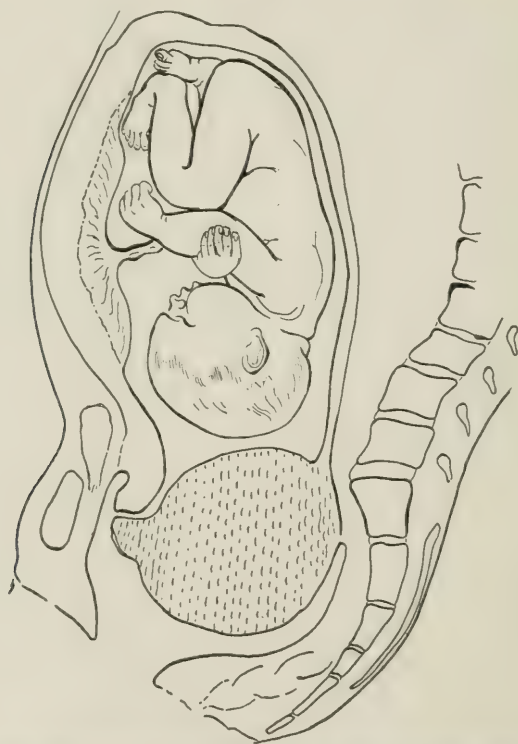


FIG. 1.—Diagrammatic cross-section of trunk showing fibroid below pelvic brim with fetus above.

October, 1912. She had never been previously pregnant and her menstrual history was normal in every respect, there being no menorrhagia present at any time. Her last regular period occurred on February 14, 1913, and on consulting her physician during the last week in April, 1913, the pelvic tumor was diagnosed for the first time. She was advised to have her pregnancy terminated and entered a hospital for this purpose but concluded that as she had no

symptoms from the growth, she would try to carry the child to term.

She was first seen by the writer on September 20, 1913, when an abdominal examination showed the fetus to be about seven and one-half months. The fetal heart was heard faintly around the umbilicus, probably on account of the thick abdominal wall. Vaginal examination showed the pelvis obstructed by a large soft rounded mass above which the fetal head could be distinctly palpated. The cervix was small, moderately softened, not dilated, and occupied a position in back of the symphysis where it could be reached with difficulty. The pelvic measurements were normal. The question of the induction of labor presented itself but as the woman was absolutely free from all symptoms, except a slight abdominal discomfort, it was decided to allow the pregnancy to continue. The patient was seen at regular intervals and the growth of the fundus followed. She was

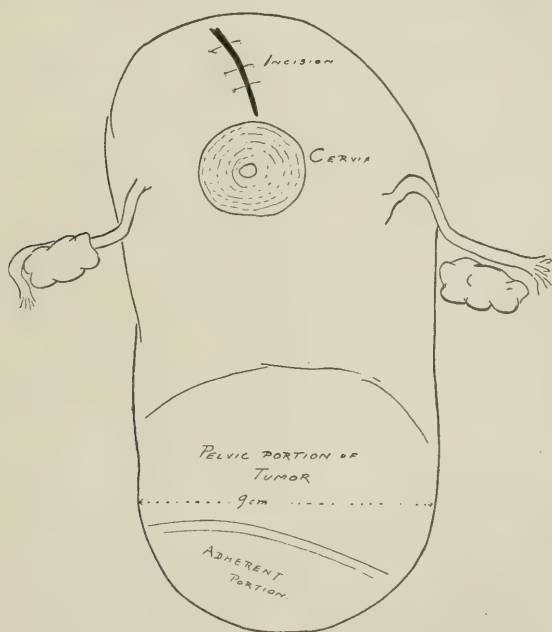


FIG. 2.—View of extirpated uterus from in front showing relation of cervix to pelvic portion of the fibroid tumor.

admitted to the Lying-In Hospital on November 27, the end of the pregnancy having been calculated for November 21. She had irregular and slight pains after a thorough purging with castor oil but no change could be noticed in the position of the tumor, or the dilatation of the cervix. The pelvic mass seemed firmly fixed and it was impossible to displace it. A Cesarean section with possibly a hysterectomy was decided on, and the patient was operated on March 29, 1913. Ether was given by the drop method and one coat of iodine applied before operation. This was washed off with alcohol previous

to making the incision. A hypodermic of ergotole (m. xl) was administered at the beginning of the anesthetic.

In view of the necessity for doing a hysterectomy, the incision was made in the median line below the umbilicus and within three inches of the symphysis. On entering the abdominal cavity the uterus was found to be irregular in shape with firm walls containing a number of fibroid nodules. The peritoneum was loosely attached over the entire anterior aspect of the uterus and the vessels on the surface were greatly distended. The incision in the uterus was made in the median line and the wall found to be at least 2 inches thick. After the cavity was reached the hand was introduced, the membranes freed, the sac ruptured, and the fetus extracted by the breech. It was readily resuscitated. The placenta was quite friable but was extracted completely together with the membranes. Both the placenta and the membranes showed a decided yellow tinge. The cut section of the uterine wall was firm and did not bleed as much as in an ordinary case. There were numerous large and small fibroid masses present over the entire anterior segment of the uterus and the lower portion was likewise made up of a rounded fibroid mass which almost completely filled the pelvis. The wound in the uterus had been closed to stop the bleeding and as the patient seemed in good condition, a hysterectomy was decided on. Anterior and posterior peritoneal flaps were formed and the ovarian arteries on either side tied off. Owing to the presence of bands of adhesions and the varicose condition of the surrounding veins, it was not possible to save the ovaries and these had to be removed with the uterus. In making the posterior flap, the uterus had to be lifted out of the abdomen and this could only be accomplished after the pelvic portion of the same was freed from the inlet where it seemed firmly wedged. A supra-vaginal amputation was successfully done and the cervical stump then sewed over with interrupted chromic gut. After suturing the anterior and posterior peritoneal flaps the abdominal cavity was closed in layers. The patient's pulse began to go up in the early stages of the hysterectomy and a 1000 c.c. of salt solution was introduced under the breasts. On the left side the descending colon was bared because of its adhesion to the uterus but this was carefully sewed over and gave no further trouble. The patient made a perfectly uninterrupted recovery with the exception of a slight pyelitis which developed in the second week but rapidly subsided. She left the hospital at the end of the third week, both she and the baby being in excellent condition.

The case, with the specimen shown, demonstrates conclusively the inadvisability of waiting too long in the presence of this form of dystocia before resorting to a radical operation. The question of doing the hysterectomy at a later time seems to be answered by the favorable recovery which resulted in this case in comparison with the possible sloughing and degeneration which might have occurred in this fibroid mass had it not been removed.

DR. PARKER SYMS read the paper of the evening, entitled:

CHRONIC CYSTIC MASTITIS OR ABNORMAL INVOLUTION OF THE BREAST.
ITS RELATION TO CANCER.

IN this timely contribution to the subject of precancerous disease, the author emphasizes the complex character and relatively unknown etiology of a disease of the mammary gland to which a large number of names have been applied by different observers, on the basis of its variegated histopathological picture. Although perhaps best known as chronic cystic mastitis, on account of the characteristic cyst formation, it has also been described as interstitial mastitis, epithelial cirrhosis, cystadenoma, lobular fibroma, senile parenchymatous hypertrophy, abnormal involution of the breast, and even as chronic mammary tumor, on account of more or less distinctly outlined tumors in certain segments of the organ.

Concerning the etiology of the disease, not much is known beyond its occurrence, usually after the third decade of life, in women, irrespective of preceding childbirth or lactation. Although more rarely attacked than women, men are not exempt. As the disease is apt to develop between the thirtieth and fiftieth year, or the period of retrogressive changes, it has very appropriately been described as an abnormal involution. It represents moreover a transformation in the breast during the actual cancer-period, and must be considered as a precancerous condition on account of the remarkable changes of the epithelium, and the tendency of these cases to become cancerous. The organ presumably reacts in this way to some form of irritation, mechanical, chemical or bacterial. Traumatism does not seem to play a predisposing part. Occasionally, the chronic form is preceded by an acute inflammation of the mammary gland.

The author is inclined to refer the changes of chronic cystic mastitis to the very unstable nature of the structure of the gland itself, and the equally unstable nature of its physiological function. He emphasizes the transient function and almost transient existence of the organ, which is not really developed until the age of puberty and undergoes important changes at each menstrual period, to become virtually altered in pregnancy and invested with a new function during lactation; other structural changes of a retrogressive type, attend the arrest of lactation, to become accentuated and permanent after the menopause.

In this connection, the author points out the singular analogy between this abnormal involution of the breast and the senile hypertrophy of the prostate gland, or chronic cystic prostatitis, likewise a forerunner of cancer in many cases. In the mammary gland as well as in the prostate, the peculiar increase and decrease in glandular activity and the resulting structural changes are subject to disturbances of the delicate equilibrium, with overproduction of one or more of the tissue constituents and a tendency to tumor-formation with malignant change. On the basis of these reflections, it is

readily understood that chronic cystic mastitis has been interpreted by some observers as a purely inflammatory process and by others as a simple hypertrophy, while the tumor-formation alone has been emphasized by others.

After a statement to the effect that the disease is undoubtedly primarily an inflammation, the author explains that the various pathological changes represent either distinct stages of the disease, or its development according to certain tendencies. A comprehensive name would of necessity be rather lengthy, for example: chronic mastitis with fibrous and glandular hyperplasia with retention-cysts. Not only the different cases of the same disease, but actually the different parts of the same breast may present a variety of pathological changes, often of a contradictory and misleading character.

The glandular structure of the organ being attacked by the inflammatory process rather than the ducts, the changes are most pronounced in the periphery of the breast; consisting in proliferation of the glandular epithelium and of the fibrous tissue which make up the stroma of the gland. The characteristic cyst formation has been explained in a variety of ways. The retention theory accounts for them by the overproduction of fibrous tissue in the canals and ducts, with obliteration of the lumen due to stricture. The cysts have also been explained as the result of coalescence between the acini and the ducts through the breaking-down of fibrous septa. Still another explanation is through actual epithelial hypertrophy and proliferation, with ultimate desquamation and degeneration of the normal epithelial cells. Very active epithelial changes, suggestive of the epithelial changes in a lactating gland, are characteristic of this form of chronic mastitis, affecting not only the character but also the number of the cells, several layers becoming superimposed upon each other and arranged in cylindrical masses, with papillary formations inside of the cavities. If the hyperplasia of the fibrous tissue predominates, the result is a thickening of the walls of the acini, the ducts, canals, and canaliculi. Instead of leading to the formation of an encapsulated tumor, however, these overproductions simply resemble tumor-like masses, in which the microscope shows adenofibroma or fibroadenoma, according to the predominance of the glandular elements or the fibrous tissue constituents.

The behavior of the glandular epithelium, meaning the degree of the departure of the cells from the normal standard, in certain vital particulars, is decisive for the presence or absence of cancerous change. The author calls attention to the fact that epithelial changes are not necessarily cancerous. It is the ultimate penetration of the basement-membrane, by masses of more or less atypical and displaced epithelial cells, which have infiltrated the surrounding structures, and their subsequent independent growth, which stamp the microscopical picture as one of carcinomatous change. Sometimes, many sections of the same breast, up to thirty or forty, are examined, before a suspicious or positively cancerous spot is discovered. It is well to keep in mind the author's plain statement that the remaining parts are precancerous states or potential cancers; for

the different histological changes really represent progressive stages of the disease. Although fortunately not every case terminates in cancer, the number which do so is more than sufficient to mark the condition as one predisposing to cancer, briefly as a precancerous state. Unfortunately there are no available clinical methods of determining the existence or progression of pathological changes in a given case. Although it is generally conceded that cancer is likely to follow, the exact proportion of cases which become cancerous has not been established by uniform statistical data. The signs of cancer evolution in these cases are not reliable, as well brought out in the author's description of the symptoms.

The question of treatment is of course closely affected by the interpretation of the disease as a forerunner of cancer. Unsparring ablation of the breast is indicated, once the condition is admitted to be precancerous. Others claim that the patient's interests are sufficiently served through the removal of apparent tumor-formations; the author is inclined, however, to consider the condition of chronic cystic mastitis as more than a possible cancer, but directly as a forerunner of cancer. Each case should therefore be treated as a cancer in embryo, which means that the affected breast should be entirely removed. Simple amputation is regarded by him as less efficient than radical ablation, which besides being the only safe procedure, is no more dangerous or mutilating than the incomplete method of breast amputation. Partial operation, meaning the removal of one or more prominent tumor-like masses, is a mistake, for it is open to the objection that benign tumors will be removed and malignant growths be left behind, in a certain proportion of the cases. The removal of a small portion of a diseased gland and its immediate microscopic examination in frozen sections, as recommended by some, will also prove a source of error in a number of cases; for the transition into cancer may be limited to a part of the gland which has been left behind. In an instructive case, recently reported by the author, concerning a woman with typical chronic cystic mastitis, with a well-developed fibro-adenoma in the upper outer quadrant of the breast, he performed a radical ablation of the breast, on the basis of the clinical evidence and his personal conviction. The first pathologic diagnosis of the specimen was fibroadenoma without evidence of cancer; but a subsequent examination resulted in the discovery of epithelial changes of a distinctly cancerous character.

Early radical operation, the author tells us in conclusion, will result successfully in 100 per cent. of the cases, while the waiting and watching policy, or treatment by the incomplete operation, will result in a certain number of failures.

At the present day of more widespread knowledge of cancer on the part of the general practitioner and also of the public, the operating surgeon has occasion to see an increasing number of cases of chronic cystic mastitis in the earlier stages of the disease, before the development of cancer, and the safety of the patients entrusted to his care is governed by his appreciation of the disease as a forerunner of cancer.

DISCUSSION.

DR. A. ERNEST GALLANT said that he first came to a decision as to the necessity of removing these breasts in toto, from cases seen at the General Memorial Hospital in 1892. This view had been confirmed later by listening to a paper by W. W. Keen, whose analyses of a number of tumors of the breast had shown that every neoplasm, of whatever variety, had in some instances sooner or later degenerated into the malignant type, and he recommended the earliest removal by radical operation of all breast in which any other than a temporary galactoceles was found.

To-day, Dr. Gallant had seen a nurse whose breast presented the condition so graphically described by Dr. Syms, with palpable enlargement in the axilla. However, as the engorgement varied with each menstrual period, and as the periods recurred every three weeks, she was advised to have the metrorrhagia corrected "at the source" and then be guided by the after effect on the glandular mastitis.

The small size of these nodulations cannot be accepted as any criterion of the benign or malignant nature. Some years ago he reported a case with galactocoele, several weeks after miscarriage, which was dissipated by very snugly bandaging the breast, but only to make clear the presence of hickory-nut sized tumor. A radical operation was done; but she died within twelve months of mediastinal carcinoma. The small nodule proved to be adenocarcinoma.

Dr. Gallant had operated on a considerable number of patients presenting cystic or adenofibroid tumor, and has had no cause to regret such radical work, as not one of these patients has had a recurrence, though in two cases the second breast had to be removed a year later.

Prompt, radical operation is the only hope of saving these unfortunate women from the danger of malignant disease, and if young, an early death.

DR. FORBES HAWKES said that he recalled two cases that had been under the care of Dr. McCosh at the Presbyterian Hospital where a cyst had been removed for chronic cystic mastitis and in which there was no suspicion of malignancy; both patients, however, had died within a year and a half of the operation from general carcinomatosis. In cases of so-called chronic cystic mastitis it was better to remove the whole breast by radical operation, for otherwise portions might be left behind containing malignant cells. Many cases of chronic cystic mastitis had enlarged axillary glands on the same side. He had never had a report of carcinoma on such glands but thought that it was wiser to remove the gland at the time of the mastectomy.

DR. PARKER SYMS, in closing the discussion, said that while one must be convinced of the advisability of a radical operation in these cases, when it came to individuals and became a personal matter the problem was very difficult, and one was tempted to do less than his best. Assuming that one in ten of these cases is cancer, then by resorting to the incomplete operation one would be right nine times out of ten, but he would be wrong once in ten cases. This may be

tempting but is a too great risk to recommend. There is only one safe advice to give and that is radical operation, but this is difficult in individual cases. Dr. Syms said that he had recently been consulted by a young woman about to be married. She had a chronic cystic mastitis with a benign fibroepithelial tumor. Under the circumstances he did not feel like subjecting her to a radical operation. Although Dr. F. E. Sondern had reported that there were no evidences of malignant growth, Dr. Syms said he would watch the future of that breast with great anxiety and with a great sense of responsibility.

REVIEWS.

ARTIFICIAL PARTHENOGENESIS AND FERTILIZATION. By JACQUES LOEB, Member of the Rockefeller Institute for Medical Research. Originally translated from the German by W. O. REDMAN KING, B.A., Assistant Lecturer in Zoology at the University of Leeds, England. Price \$2.50 net. The University of Chicago Press. Chicago. 1913.

This book is based on a German work by the same author published in 1899 in which he first gave a collected account of his experiments on artificial parthenogenesis. The object of these experiments was to show the possibility of substituting physicochemical agencies for the living spermatozoon. Professor Loeb's work in this field met with very extended attention among biologists and their observations in addition to those more recently made by himself, have necessitated a revision of the original work and its translation. In the present work the author presents a survey of the methods by which the unfertilized egg can be caused to develop into an embryo and the conclusions which can be drawn concerning the mechanism by which the spermatozoon produces this effect. It is claimed that there are two factors at least involved in this process. One brings about the change in the surface of the egg, the essential factor, and the other the corrective factor. As the problems of fertilization are intimately connected with those of physiology and pathology, Professor Loeb's observations are of great practical importance to medicine itself and his writings are therefore deserving of special consideration by research workers and the profession. This phase of the subject requires further development and the relation of Loeb's theories to abnormal cell growths in the human body should prove a subject of considerable interest. It is to be hoped that in a subsequent work the author will demonstrate the possibility of these relations more effectively.

PRIVATE DUTY NURSING. By KATHERINE DEWITT, R. N. J. B. Lippincott Company, 1913. Philadelphia and London.

Miss DeWitt's book may be characterized as a most satisfactory work to place in the hands of the nurse who has either graduated

recently or has already been in practice for a number of years. It is entertainingly written and will repay reading from cover to cover. It contains a great many things that the nurse who has just graduated from a hospital training school needs to be informed about and it cannot but be of service to one whose continued activities have kept her from progress in medicine and surgery. The chapters on the nurse's qualifications, directories, engagements and charges, clothing, equipment, the relation of the nurse to the family and patient, and finally to the doctor, are of value not only to the nurse but might be read with advantage by physicians. The chapters on preparation for surgical and obstetrical cases, training of babies, care in contagious diseases, and the peculiarities of nursing in hotels and while travelling are full of interesting facts and directions. The concluding chapter on the "old nurse" should be read by every one who might consider herself in this class, as it will aid in overcoming the difficulties which apparently meet her at this stage. Miss DeWitt's book is worthy of a very wide circulation.

COMPEND ON BACTERIOLOGY. By ROBERT L. PITFIELD, M. D. Second Edition. With 4 plates and 85 other illustrations. Price \$1.00 net. P. Blakiston's Son & Co. Philadelphia. 1913.

This book was designed by the writer largely to serve the needs of the medical student preparing for examination and also to afford the practitioner of medicine the principal facts in this rapidly growing science. The standard text-books on the subject have been largely drawn upon and the book presents a very satisfactory résumé of this important subject.

OBSTETRICS. A Manual for Students and Practitioners. By W. P. MANTON, M. D., Professor of Obstetrics and Clinical Gynecology, Detroit College of Medicine, Detroit, Mich. Second Edition, revised and enlarged; including selected list of State Board Examination Questions. Cloth, \$1.00 net. Lea & Febiger. Philadelphia and New York. 1913.

The little book herewith noted presents an excellent résumé of obstetrics particularly suitable for the medical student. It seems to come nearer the world renowned little manual of a similar character by Prof. Dührssen than any other similar work in the English language. The book is very comprehensive and serves as an excellent epitome of modern obstetric knowledge. There is little to be said in criticising this volume and very much to be praised. A series of practical questions is appended to each chapter and at the end of the work is presented a selected list of State Board Examination Questions.

AIDS TO GYNECOLOGY. By S. JERVOIS AARONS, M. D., Edin., M. P. C. P. London. Fifth Edition. William Wood & Company. New York. 1913.

In re-writing this book the author has adopted the plan of grouping the subjects presented under pathological rather than anatomical headings, in the belief that this classification is more scientific and

has in addition the undoubted merit of avoiding constant repetition. A great many of the obsolete illustrations which characterized the former editions of the work have now been omitted. The author deals with only the essential points in gynecology, particular attention being given to symptoms, diagnosis and treatment. The book is very similar to the student's manuals which are so well known in this country with the exception that more attention is paid to the treatment than is usually the case in the latter.

A TEXT-BOOK OF HISTOLOGY. By FREDERICK R. BAILEY, A. M., M. D. Fourth Revised Edition. Price \$3.50 net. New York. 1913. William Wood & Company.

The general plan and scope of the present edition is similar to that of the previous ones. The text has been thoroughly revised and some parts of it rewritten. Dr. Oliver S. Strong again contributes a revised chapter on the nervous system which is illustrated by a large number of original drawings and photographs. The book is designed to be used in connection with a course of practical laboratory instruction and classroom teaching is the basis for the book. The rapid succession of the various editions of Dr. Bailey's book, points to the favor with which it has been quite generally received. A final work of commendation may be given to the index which is much more complete than usual. The printing and the illustrations are very satisfactory.

THE PSYCHONEUROSES AND THEIR TREATMENT BY PSYCHOTHERAPY. By PROF. J. DEJERINE, Professor of the Clinic for Nervous Diseases of the Faculty of Medicine of the University of Paris, and Dr. E. Gauckler, Ancien Interne of the Hospitals of Paris. Authorized translation by Smith Ely Jelliffe, M. D., Ph. D. Price \$4. Philadelphia and London. 1913. J. B. Lippincott Company.

There is an immense number of minor psychic disturbances which render many individuals unhappy, discontented and even confirmed invalids. Their disturbances are summarized under the headings of functional neuroses, nervousness, neurasthenia, hysteria, psychoneuroses, etc. Owing to the difficulty of studying these conditions they have been largely neglected as objects of scientific medical inquiry. The advances made in recent years in the fields of neurology and psychiatry have fortunately resulted in a desire to examine these psychic problems and scientific medicine is beginning to take its place in this domain, which has heretofore been left to the quasi-scientific and religious cults that have sprung up like mushrooms over the entire civilized world. The French neurologists have given this subject more attention than those of other nations and Prof. Jelliffe deserves a great deal of commendation for placing the work of such well-known men as the authors of this book before the English reading public. The most important factor in this work is the claim that many patients may be treated and cured of the minor psychic disturbances without the more detailed analyses which are employed in more complex situations. Thus the prompt handling of an emotional situation, or a sound dialectic may secure for a

large number of patients the relief necessary to effect an adjustment of their mental state in contrast to those for whom a Freudian analysis will be required. The relations between gynecology and psychiatry are very close and of great importance. In a large class of female patients in whom neurotic disturbances are present, recourse to the gynecologist is not unusual and very often the lesions will occupy the center of interest when in fact they might occupy a subordinate place. A considerable portion of this book is taken up with the various nervous disturbances that are connected with the genital organs. The sexual life of a woman occupies such an important position in her make-up that aberrations of the same are very likely to be reflected in other organs and functions, so that we have a large series of mental disturbances which may be traced to abnormalities or lesions of the generative tract. The authors describe these very completely and this as well as other portions of the book well repay the attention of the gynecologist. They describe very appropriately the false gynecological manifestations which are so common at the present day in which the treatment is merely apt to fix the patient's mind upon her genital organs, so that her whole existence is absolutely centered on the same. The treatment of these conditions cannot be discussed within the limits of a brief review. The authors believe that although as far as their secondary phenomena are concerned, the psychoneuroses may be treated in various ways, there is but one etiological therapy for them, viz: psychotherapy. They claim that there is but one legitimate form of psychotherapy, namely: the psychotherapy of persuasion, which should be addressed both to the symptoms and to the mental and moral make-up which has permitted them to become established. The work of Drs. Dejerine and Gauckler is worthy of a place in the library of every gynecologist.

The favorable comments brought out by the first edition of Dr. Morse's book can likewise be applied to the present one and the value of the book both for the student and practitioner is undoubted.

MARRIAGE AND GENETICS. Laws of Human Breeding and Applied Eugenics. By CHARLES A. L. REED, M. D., F. C. S. 1913. The Galton Press. Cincinnati.

During recent years the public has been favored by studies and observations on the sex question from so many sources that one approaches with a feeling of hesitation any new work on this subject. Printer's ink has been employed very lavishly in presenting the opinions of all sorts of people, most of whom are not qualified either by experience or study to present their views on such an important subject. The book here noted is from the pen of a surgeon who states that his daily life is largely engaged in dealing professionally with conditions that affect the power of the human race to perpetuate itself. The author believes that only such means will be successful in the treatment of this condition which tend to overcome the ignorance which keeps innocent victims from protecting themselves and their offspring from disease and degeneracy. This makes it necessary to

consider the natural laws of human breeding inherent in the individual. Unfortunately these laws are often vague or ambiguous and their application is but rarely explained in terms that are comprehensible to the ordinary lay reader. In addition the author adds a brief description of the two diseases, incidents of vice, that he believes are to-day poisoning the race. A concluding chapter on "applied eugenics" represents an endeavor to translate the abstract into the concrete and consists of a brief summary of genetic factors, etc., that fall within the domain of laws underlying selective breeding in the human family. In reading Dr. Reed's book one is impressed by the fact that the author earnestly believes in the value of presenting such facts to the laity. Whether they can be absorbed in the comparatively short period of probation since this agitation was begun is questionable. The free circulation of books of this kind will undoubtedly result in many copies falling into the hands of persons who will be hurt rather than benefited by their reading and although he has made an attempt to present the subject in comparatively simple language, it is quite doubtful whether the text will be satisfactorily appreciated, or whether in many instances a feeling of unnecessary fear will not dominate the reader after completing the book. It is a very difficult matter to discuss the question referred to with sufficient delicacy, notwithstanding the author's desire. Although a knowledge of the facts that underlie normal and healthy reproduction are important to everyone, their character is such that a mantle of modesty ought nevertheless be employed in their discussion, but at the present day the subject has become one for such general conversation that this attribute has unfortunately been largely discarded.

BRIEF OF CURRENT LITERATURE.

OBSTETRICS.

Treatment of Metastases and Recurrences from Carcinoma of the Breast.—G. E. Pfahler (*Surg., Gyn. and Obst.*, 1914, xviii, 90) says that more has been accomplished by radio-therapy than by any other measures. In at least one of fifteen cases studied there seemed to be produced some constitutional condition which led to the rapid disappearance of carcinomatous tissue that had not even been exposed to the rays. The disease should be treated as actively and with as large doses as circumstances will permit, using every possible means for the protection of the skin. The best time to treat with the rays is immediately after operation when least disease is present. The additional administration of thyroid extract in small doses seems to aid materially in the cure of the disease. This the writer has used in 150 cases with apparently good results. He usually begins with the administration of one-half a grain of thyroid extract, three times a day, after meals. This is increased every

four days one-half a grain in the daily dose, until the patient is taking one and a half grains three times a day, and never over two grains, three times a day.

Causes of Affections of the Mouth and Teeth in Pregnancy.—Piero Parazzi (*Ann. di ostet. e gin.*, Nov., 1913) finds that in mouths of pregnant women there is a marked increase in the number of microorganisms, and that these cause caries of the teeth and changes in the mucous membrane of the mouth and gums. It is the duty of every hygienist to advise disinfection of the mouth and teeth frequently in pregnant women, in order to limit decay of the teeth and to urge immediate repairs. The use of a diet rich in salts will prevent the decalcification of the teeth which occurs as a result of the demands of the fetus for calcium salts, a condition which aids the microorganisms in their deleterious action on the teeth. An open tooth pulp presents an easy port of entry for streptococci and other infections which may become generalized through blood-vessels or lymphatics.

Lipoids of the Blood and the Lipolytic Action of Blood Serum in the Puerperal State.—Michele Bolaffio (*Ann. di ostet. e gin.*, Nov., 1913) has observed and carefully tabulated results of observation of the lipoids as found in the blood of pregnant and puerperal women. He finds that the slight gravidic hydremia need not indicate an increase of fats in the blood in pregnancy and the puerperium. It depends on a lessened lipolytic activity of the serum which is present in the pregnant woman. The author concludes that there is a gravidic lipemia, accentuated toward the end of pregnancy, and increasing in labor. It remains during the first days of the puerperal state and then gradually declines at the end of a week. It is accompanied by a cholesterinemia. This lipemia may be interpreted as due to a transportation to the mother of fats from the uteroplacental sinuses.

Reaction of Abderhalden in the Diagnosis of Pregnancy.—Berthe Sabin (*Presse méd.*, Dec. 13, 1913) says that the principle of the Abderhalden test depends on a humoral modification in the pregnant woman, consisting in the formation of proteolytic ferments. They are believed to be due to the appearance in the circulation of the pregnant woman of chorionic cells. The proteolytic ferment is found in the first growth of the placental tissue; it also occurs when the ovum is abnormally placed, and continues in all remnants of living placental tissue. The method of making the test is described and the extreme care that must be taken in washing and preparing the placental tissues for the test. Only the work of an experienced operator can be considered authoritative. The author has tested seventy-two specimens of serum: in forty-three cases the reaction was positive, and in thirty-nine the result was confirmed by the presence of the signs of pregnancy. The women examined all had a retardation of menstruation of from eight to forty days. In the four doubtful results pregnancy had advanced to more than eight months. In sixteen cases the results were negative, and were confirmed by the absence of the signs and symptoms of pregnancy. Three of them were tuberculous, one syphilitic, one had a retroverted fibroma. In

a woman pregnant four months with severe vomiting the reaction was negative. In abortion with placental remains *in utero* there was a positive reaction in three women, under eight days from rupture of the ovum; in four after fifteen days the test was negative. The author believes that when the test is more accurately applied and with greater experience it will be found of increasing value in the diagnosis of pregnancy.

Abderhalden Reaction at the Tarnier Clinic.—M. G. Ecalle (*Bull. de la Soc. d'obst. et de gyn. de Paris*, Nov., 1913) gives reports of the results obtained in sixty-four tests of the Abderhalden dialysis test for pregnancy. These were made in thirty-three different pregnant women, some being tested with more than one placenta. These he adds to fifty-five cases already published, making in all 119 tests, in all of which there has been a positive reaction, but differing in degree. In twenty-four nonpregnant women the author made forty-four tests, with thirty-four negative results. The ten positive reactions came from seven women affected by various surgical diseases, abdominal or gynecological. Whatever placenta was used the results were the same for the same woman.

Serum Reaction in Pregnancy and Cancer by the Coagulation Method.—Analyzing the results which he has obtained by the coagulation method, W. W. King (*Jour. Obst. and Gyn. Brit. Emp.*, 1913, xxiv, 296) claims that the test is positive all through pregnancy. It may be negative in pregnancy in the presence of severe septic infection. With certain limitations it is possible to diagnose carcinoma and sarcoma, but not to differentiate them from pregnancy because the ferments are not absolutely specific. The coagulation method is useful because it does not require special apparatus; it avoids the errors associated with faulty dialyzers, and it is not so susceptible to slight hemolysis of the serum. This method, however, requires at least twenty hours' incubation and the use of 0.3 c.c. of a 1 per cent solution of ninhydrin in order to obtain positive results in pregnancy.

Rupture of the Uterus Following Cesarean Section.—L. I. Breitstein (*Jour. A. M. A.*, 1914, lxii, 689) records a case in which Cesarean section was followed by a spontaneous delivery by the vaginal route, and this by pregnancy with rupture of the Cesarean scar, necessitating abdominal hysterectomy. He concludes that a cesareanized woman who gives a history of an infection with a purulent vaginal discharge in the puerperium is a good candidate for rupture of uterus in one of her subsequent pregnancies. The mere fact that a cesareanized woman has delivered herself spontaneously is no reason for believing that she is free from the danger of rupture of the uterus with her future pregnancies. Rupture of a Cesarean-section scar generally takes place in a scar resulting from improper wound-healing in the presence of infection. The implantation of the placenta on the site of the scar may so weaken the uterine tissue that it may rupture under the strain and stress of labor. He believes that Cesarean section should be limited to those cases in which it is strictly necessary. If there is any possible chance for the uterine wound to

become infected, some operative measure for sterilizing the patient should be employed. A cesareanized woman should be in a maternity hospital during the last month of her subsequent pregnancies so as to be under constant medical supervision.

GYNECOLOGY AND ABDOMINAL SURGERY.

Clinical and Experimental Study of the Internal Secretion of the Mammary Gland.—Cuiseppe Cavagnis (*Ann. di ostet. e gin.*, Nov., 1913) has made a clinical and experimental study of the effects on the uterus, of injections of the internal secretion of the mammary glands. Many observers have testified to the beneficial effects of the extract on fibroids of the uterus, and the author corroborates these results. He finds that the metrorrhagias are stopped or relieved and in some cases there is a reduction in the size of the tumors. In some other forms of hemorrhage, and in leukorrhea it has given favorable results. Used experimentally in guinea-pigs and rabbits at the beginning of pregnancy it increases the tone of the muscular fibers of the uterus, ethereal extracts have a similar effect. It reduces the amplitude of the uterine contractions in labor. The extract from a gravid animal has the same effect as that of the nongravid one. Pituitrin has a much more marked effect. Mammary extract causes vasomotor constriction and increase of blood pressure. In the human subject it causes constriction of the vessels, contractile hypertonicity, and diminished congestion of the uterus. It retards the development of the fibromatous nodes and favors regression of those already formed.

Effect of the X-rays on the Ovaries.—A. Lavant (*Arch. mens. d'obst. et de gyn.*, Dec., 1913) gives the results of his use of the x-rays in sterilization of rabbits. In a first period the ovarian follicles disappear; degeneration begins a few hours after application of the rays, and is finished at the end of two weeks: nevertheless it is rare to see an ovary entirely sterilized so that the animal cannot be impregnated later. There are always some small follicles which remain intact and later mature. From the second to the fourth months is a second period; the interstitial substance regresses, the epithelium becomes flattened, like endothelium. After the fifth month a phase of repair begins; a new interstitial gland forms from the connective-tissue cells of the stroma. Then the primary follicles which have been spared grow, and finally mature, but in smaller numbers, so that the genital life of the animal is limited. In some cases these follicles never grow and the animal does not become pregnant. It is the mature follicles that are most affected by the rays and it is the degree of development of the follicle that determines its susceptibility to them. The corpora lutea irradiated forty-eight hours after coitus are not affected. If rays are applied immediately after connection atresia goes from the eighth day. From the hemorrhagic cysts formed by irradiation of a follicle a corpus luteum forms presenting glandular cells reduced in number and volume, and deformed. The interstitial portion of the ovary is not directly sensible to the

action of the rays. When sterilization occurs, or in the months of ovarian degeneration no rut occurs; but it returns when regeneration begins. Applying these results to woman we see that a definite sterilization cannot be expected by the action of the rays. Arrest of menstruation and regression of fibroids can be obtained. This is explained by a modification of the cells of the tumor, rather than by atrophy of the genital system, or ovaries. For the same reason the action of the rays on pregnancy should be slight, and depend upon the direct action on the uterus itself.

Treatment of Tuboovarian Varicocele by Intraligamentous Venous Ligation.—L. Sencert (*Arch. mens. d'obst. et de gyn.*, Jan., 1914) considers the treatment of true tuboovarian varicocele by intraligamentous ligation of the veins involved. He limits his subject to the variety in which the condition is not secondary to other pelvic troubles, but may coincide with varicose veins of the legs. The author cites a number of cases of this condition, some of them observed by him to show the existence of apparently idiopathic cases. This condition is often alone responsible for a train of pelvic symptoms including pain, dysmenorrhea, and similar symptoms, and relieved entirely by resection of the varices in the broad ligament. Seven such cases have been operated on by the author with six successes, the one failure being in a patient whose operation showed a large sclerotic uterus. The pathogenesis of this condition does not differ from that of varices in other situations. Mechanical, constitutional, and infectious factors unite to bring about mesophlebitis and ectasia of the veins of the broad ligament. One mechanical cause may be pressure of clothing over the abdomen; another the elongation and increase in volume of the uteroovarian veins in the course of frequent pregnancies occurring at short intervals. The diagnosis is very difficult, since the symptoms are the same as those of many other pelvic conditions. The chief diagnostic sign is the presence in the posterior culdesac of a tender mass that is neither a prolapsed tube nor ovary and which can be seized between the external and internal hands. Varices of the legs, vulva, or abdomen tend to be coincident with the internal ones. Medical treatment of the character usually given for pelvic conditions will have only temporary effects on this condition. Operation may be by ligation or resection of the varix. Conservative surgical treatment applies to it the same measures as are used in scrotal varicocele that is resection of the intraligamentous varices with shortening of the ligament. The operation begins with median laparotomy. Raising the broad ligament with forceps, at its upper border, between mesosalpinx and mesovarium, an incision is made including the thin peritoneal layer transversely from one end of the ligament to the other. The masses of veins are isolated through this incision, tied together at the side of the uterus and cut away between two ligatures. The same ligation is carried out at the other end of the ligament. The ends of the ligatures are then tied together so as to shorten the ligament. The peritoneal incision is sewed up and the wound closed with drainage. The existence of these varices may be

a cause of secondary troubles, edema of the ovary, progressive interstitial sclerosis, changes in ovulation, and uterine sclerosis. The passive congestion caused by the varices produces pain and dysmenorrhea, which cannot be relieved by ordinary treatment, but which does not necessitate a mutilating operation.

Theory of Pathogenesis of Dermoid Cysts of the Ovary.—J. Termier (*Rev. mens. de gyn. et d'obst.*, Jan., 1914) advances a new theory of the causation of dermoid cysts, rejecting the older one of included layers of the ovum as insufficient and not applicable to all the symptoms. He records a case in which several dermoid cysts were found, occupying both sides of the adnexa, and states that inclusion of layers would hardly occur on both sides in the same individual. The theory is stated thus: the living being arises from a single cell, which becomes differentiated so as to produce all sorts of tissues: with regular development the result is a normal being; with irregular development it may be a monster or a complex tumor. The productive power of the cells gradually decreases. Each cell contains the germ of other tissues. One cell is capable of producing bone or cartilage, another nerve, and another epithelium, mucosa, or hair. Any abnormal excitation, a karyokinetic derangement, may cause formation of all the histological tissues of which normal development is capable. A special degeneration of the ovule, associated with consecutive proliferation of the Graffian follicle may occur. The best argument for this theory is the impossibility of accepting any other solution. We have learned that other influences aside from fecundation may cause development: saline solutions, dehydration of tissues, variations in osmotic pressure are such causes. Physical agents such as heat may also cause changes. There may be exciting or retarding influences on the cell. Teratological development may result in complex products and appearance of adult tissues, such as bone and cartilage. According to the stage of maturity, and the amount of male substance added to the ovum parthenogenesis will conduct this ovule to an embryonic stage more or less advanced, but recognizable in spite of abnormal and monstrous characteristics. Irradiation of spermatozoa affects the result of fecundation. In the human ovary some cells may be arrested and develop abnormally into dermoid cysts. The cause of arrest may be uterine, such as myoma uteri: change in circulation, edema of lymphatic origin, may cause through a hydrosis or osmotic variation the same results as parthenogenesis.

DEPARTMENT OF PEDIATRICS.

ORIGINAL COMMUNICATION.

INFANTILE SCURVY; THE IMPORTANCE OF ITS EARLY RECOGNITION.*

BY

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SCURVY in infants is not a new disease. Like charity, it has probably been always with us, having been either unrecognized or regarded as acute rachitis, purpura, rheumatism and other diseases. Moeller first described it in 1856; but its true nature and pathology were first clearly demonstrated by Barlow in 1883—hence the name “Barlow’s Disease.” Eustace Smith also, in his “Wasting Diseases of Children,” Edition of 1878—and perhaps earlier—clearly described infantile scurvy as a complication of chronic diarrhea and rickets: “When the diet of the infant is too monotonous and lacking in freshness,” he says, “symptoms of scurvy begin to appear; the gums get spongy, and the knees or other joints suddenly swell up and grow exquisitely tender and painful.”

Notwithstanding these facts, scurvy is a new disease of infancy in that it was not until 1891 that the profession—in America, at least—became familiar with its symptoms, etiology and pathology through the writings of W. P. Northrup; and because it is only with the introduction of heated milk and the widespread use of proprietary, tinned and otherwise preserved foods, that it has become a comparatively frequent affection in this country—that is to say, during the last two decades.

Although scurvy is comparatively frequent (I have seen ten cases in private practice within the last two years), it is still not uncommon for it to go unrecognized by the practitioner; there are, indeed, few affections of infancy in which errors in diagnosis are so often encountered. This is particularly true of the incipient cases,

* Read before the Atlantic County Medical Society, October, 1913.

and in those not uncommon cases in which but one, or, perhaps, two symptoms are, for a time, the only visible signs of the disease; pronounced cases, with classical symptoms, being not so apt to escape detection.

The failure of the profession to recognize this cachexia of infancy is undoubtedly more frequent now than when the condition was first brought to its notice. This, I think, must be the experience of all who see many sick babies. As Northrup says: "Then (*i.e.*, when the identity of scurvy was first established) everyone found scurvy, even before its full development. By prophylactic treatment and increased knowledge of its etiology, it ceased to be frequent, until, at the present time, it is so uncommon, or even rare, that few students have an opportunity to see a case." This statement is but partially true; because, for the very reasons just mentioned, the disease has actually become more frequent: the profession having, in a measure, forgotten its existence, the means for its prevention have been neglected.

Scurvy is a serious disease, going from bad to worse, and ending fatally, alone, or from its complications, if not understood and properly treated. I have seen several deaths from it—some in which their true nature was not made clear until too late; sometimes not until years after the fatal issue: hence, the importance of possessing a full knowledge of the etiology and symptomatology of the irregular and incipient, as well as the classical cases.

Infantile scurvy has been mistaken for rheumatism; injury; Pott's disease; hip disease; periostitis; osteomyelitis; sarcoma; septic and gonorrheal arthritis; gumma; syphilitic epiphysitis; paralysis (particularly poliomyelitis), a not uncommon error lately; purpura (many cases so called being scurvy); rickets; acute hemorrhagic nephritis; tuberculosis and malignant growths of the bladder or kidney; dysentery; intussusception and teething. This formidable array shows how easy it is to fall into error, so far as this particular disease is concerned; partly because the profession has not yet learned the lesson that *the clinical course of scurvy is apt to be irregular*; a pronounced symptom, and one that is usually, perhaps, a late one, may be the initial symptom and, for a time or continuously, the only one. Thus, general tenderness, hematuria, and a swollen thigh, simulating renal growths, injury or osteomyelitis, may exist for many days, or even weeks, as absolutely the only signs of the disease.

The classical symptoms of scurvy are, or should be, known to all men. They are, in the order of their frequency: pain and tenderness

of the back and extremities, especially the legs; sponginess, lividity and bleeding of the gums; pseudoparalysis (swelling and immobility of the legs); bleeding from the nose and from the urinary and gastrointestinal tracts; ecchymoses of the skin and mucous membranes; and anemia. Cases exhibiting all or most of the above-mentioned symptoms should be, and usually are, recognized by the well-informed physician. It is the incipient and irregular types, as already stated, that are apt to escape detection—often until quite serious symptoms have appeared; hence, a more or less detailed review of the symptoms of scurvy will be quite in keeping with the purpose of this paper.

Although commonly overlooked, malaise, anorexia, digestive disturbances, pallor and fretfulness precede the outbreak in most cases of scurvy. In the great majority of cases, the first sign and the *only* sign is pain and tenderness on handling; the infant cries when it is lifted or bathed, or when its stockings or diapers are changed. Such crying in an infant between the ages of six or eight months and two years should *always suggest scurvy*, and not rheumatism, injury or rickets. The last disease is mentioned advisedly; because tenderness on handling has in the past been, and still is, regarded as one of the principal symptoms of rickets. Such tenderness, however, almost always means scurvy; and when it occurs in connection with rachitis, it is, I believe, always a scorbutic symptom and should be regarded as such, that proper treatment may be instituted early.

Next in frequency, as an initial symptom, is sponginess and lividity of the gums, which may or may not bleed when pressed upon. It is important to remember that it is *not necessary for the gums to bleed in order* to establish the diagnosis. Unnatural blueness or duskiness alone is suggestive of the disease, especially if joined with fretfulness and irritability, and, perhaps, slight fever. Many incipient cases present no other symptoms than these. The changes in the gums are usually seen about the upper incisors; but they may be limited to the molars or to the gingival border, posterior to the teeth, and *may exist when there are no teeth*. In this case, the gums may be simply livid, or a hemorrhagic bleb or tumor may be seen over the site of an advancing tooth—a *condition always indicating scurvy, and not dentition, and calling for orange-juice, and not the lancet*—the use of which, indeed, may provoke troublesome hemorrhage. The foregoing symptoms may exist, singly or simultaneously, particularly the tenderness, for many weeks before more pronounced symptoms manifest themselves; and the more pronounced, and usually late symptoms, be it again said, even at the risk of tiresome iteration, may

be the first and, for a time or all the time, the only symptoms of scurvy.

To examine the symptoms more closely: The legs are held in a very characteristic manner, *i.e.*, rotated outward, with the thigh flexed upon the abdomen, the leg flexed upon the thigh, and the feet extended. The leg is not used; slightly, at first; but finally its nonuse is absolute, thus simulating paralysis. These symptoms are usually seen in both legs; but sometimes in but one leg, and sometimes in the arms. As the disease progresses, the leg swells; but swelling of the leg may appear early and suddenly, and *without other signs*. These swellings are due to subperiosteal hemorrhages, and do not involve the joint: they are confined to the diaphysis of the bone, and *are above or below the joint*, seldom involving it. Usually there is no edema, as in periostitis, osteomyelitis, etc.; but this is not always so, edema being sometimes, though rarely, seen.

In all stages of scurvy the affected limbs are exquisitely tender. Even in the earliest periods of the affection the infant will shrink from handling, *and even before it is handled*; while in the later stages, when swellings have appeared, the terror of being touched is pitiful. *This fear of being touched is of great diagnostic importance*, and should always bring scurvy to the mind of the examiner. These limb symptoms, although the joint is rarely involved, are the cause of the most frequent error in the diagnosis of scurvy, namely, the mistaking of it for rheumatism. Griffith has reported sixteen cases in which this diagnosis was made; Northrup, one case, about a year ago, using it as a text for a sermon. Louis Fischer reported another, for the same purpose, in a recent issue of the *Journal of the American Medical Association*; and this was the diagnosis in five of the ten cases observed by me in the last two years.

This misconception will less frequently occur when it is recalled that rheumatism is of extreme rarity in infancy, especially at the age when scurvy is present, *viz.*, from the sixth or eighth to the eighteenth or twentieth month. In 1899, after a thorough search of the literature I was able to collect but nineteen cases of rheumatism in infants under one year. Hence, *when rheumatic symptoms arise in a young infant, the thought should be of scurvy, and other evidence of its existence, namely, hemorrhages, or their results, should be diligently sought for.*

Somewhat less frequently than rheumatism do the pain, tenderness and swellings of scurvy lead to the diagnosis of injury. Particularly is this so in cases with sudden onset. "The baby must have fallen," the attendant or mother says, "but I have no knowledge of

it." Sometimes the cutaneous ecchymoses ("bruises") of the disease lend color to this conception. Exceedingly puzzling are those cases in which symptoms follow so closely upon actual trauma as not unnaturally to be attributed to it—a not infrequent event, of which many striking instances are on record. With no history of trauma, however, symptoms suggestive of injury occurring in an infant of susceptible age (six to twenty months) should lead to the suspicion, at least, of scurvy. The same may be said of infants with symptoms of sarcoma and the various inflammatory bone lesions common in early life. In the latter condition, edema and fever, it is true, are constant phenomena; but they also occur occasionally in scurvy. I have seen considerable fever in cases with no other symptoms than tenderness and fretfulness.

Now that poliomyelitis is so prevalent, and before, the pseudoparalysis of scurvy has, on more than one occasion, been mistaken for the former affection. The orthopedist sees many of these cases, and the diagnosis is not always easy. In infantile paralysis, there is actual loss of power; while in scurvy the limb is not moved because of pain. There may be tenderness and pain, too, in paralysis, as in scurvy; but in the former, it disappears early, while in scurvy it persists and the limb is swollen—a symptom unusual in paralysis. The limb is flaccid in paralysis; in scurvy, rigid. There seem, however, to be exceptions to this rule. When the legs are flaccid in scurvy, it is because movement is painful; if they are disturbed or touched, they become rigid at once. Here, again, it must be repeated and emphasized that it is important to know that scurvy may begin with symptoms simulating any of the conditions above described.

A characteristic feature of scurvy is hemorrhage; to it indeed, most of the symptoms are due. Sooner or later, hemorrhage of some kind occurs in every case, and should always be sedulously sought for in suspected cases. It manifests itself in the gums, mucous membrane and skin. In the latter situation the ecchymoses may be mistaken for bruises, giving rise to the suspicion of trauma; or purpura may be suspected. The condition of the gums has been described already. Hemorrhage may occur in the roof of the mouth, around the eyes (giving the "black eye" appearance) or behind the eyeball, causing proptosis. Instances have been recorded in which this was the initial and only symptom. Nose-bleed is frequent. I have known it to precede tenderness and other symptoms for many weeks, *and scurvy should be considered when nose-bleed occurs repeatedly in an infant of*

suitable age (six to eighteen or twenty months). The intestinal mucous membrane is sometimes the seat of the bleeding, simulating dysentery (colitis), and even intussusception. Erdman reports a case in which operation was actually performed under this misconception.

Hemorrhage from the urinary tract is quite frequent, blood being found, microscopically, in the urine of about 60 per cent. of the cases. Hematuria, as mentioned above, is not unusual. As an initial symptom, it occupies a high place, occurring, according to Morse, in one-fourth of the cases. *It is important to remember that it may be the only symptom for weeks.* With the knowledge that simple hematuria in an infant may be, and is, usually, scorbutic, many cases will escape the diagnosis of tuberculosis, sarcoma, hemorrhagic nephritis, uric-acid infarction and so on.

Of the greatest assistance in the diagnosis and early recognition of scurvy is familiarity with the factors now generally accepted as causative of the disease. One of the most important of these is age: the disease is encountered most frequently in the latter half of the first year and the first half of the second year; it seems to *have a special preference for infants between the eighth and fifteenth months*; yet it has occurred as early as three weeks, and as late as twelve years.

Scurvy occurs more frequently among the well-to-do than among the poor, probably because the latter permit their babies to eat all kinds of food, even at a very tender age. Food, consequently, is another, and probably the most important, etiological factor. Proprietary foods, alone or mixed with fresh or boiled milk; dried or condensed milks; and boiled, sterilized, pasteurized and peptonized milk or milk formulæ have all, at times, appeared to be the cause of scurvy. The same may be said of foods or milk deficient in nutritive qualities, particularly protein-poor milk and milk formulæ. In those rare instances in which the disease has occurred in breast-fed infants, this (that is, deficiency of protein) was probably the offending factor. Whether or not the pasteurization of milk is productive of scurvy, is a moot question; but I have seen two cases of incipient scurvy in which the only discoverable cause was the use of twice-pasteurized milk. In both these cases the mother, unknowingly, had pasteurized an already commercially pasteurized milk. This is not an uncommon procedure when uncertified milk is employed, since all other milks (those sold in this vicinity, at least) are pasteurized by dealer or producer before distribution.* Hence, it is a wise

* In summer, during the warm weather, these milks are frequently heated far above the pasteurization point.

precaution for the physician, when directing parents to pasteurize milk, to warn them to employ only fresh milk for this purpose. My experience has taught me that malted foods appear to increase the tendency to scurvy. Keller's Malt Soup, now so popular, has been responsible, I believe, for many cases; and this is a danger that we must also guard against in connection with the use of the much exploited Dextrin-maltose, as a substitute for milk- or cane-sugar. I have not seen scurvy from this cause myself; but that an analogous proprietary malt-dextrin food, even when added to fresh milk, has been, and still is, answerable for occasional cases, is well known.

It would not be profitable, nor is it necessary, to review in this paper all the theories that have been advanced for the explanation of scurvy. The lack of freshness in, and the overheating of, food, and its composition, still seem to be the most important known factor in the development of the disease; but there is probably, in addition, an individual predisposition. Else, everybody fed upon proprietary and otherwise faulty foods would acquire scurvy; while, in reality, this happens in only a certain number of individuals so fed. "The farther the food is removed in character from the natural food of the child, the more apt is its use to be followed by scurvy."*

These facts about age and food, and the relation that they bear to infantile scurvy are, as already said, of the utmost importance in recognizing the disease. Whenever an infant from six to eighteen or twenty months of age, especially from the eighth to the sixteenth month, presents symptoms suggestive of injury, rheumatism, neuritis, joint affections, sarcoma, osteomyelitis or paralysis, or has hematuria, nose-bleeding, signs of purpura, or hemorrhages into skin and mucous membrane, scurvy should be thought of, and a careful inquiry should be made into the manner of feeding, the mode of preparation and the composition of the food; for with a full knowledge of the causes of the disease, few cases of this interesting and fascinating infantile disorder will escape detection. Interesting and fascinating, because, in the whole range of pediatric practice, no disease exists where the results of treatment are so remarkable or so readily attained.

The purpose of this paper, as has been repeatedly stated, even to the point of weariness, perhaps, is to encourage the early recognition of scurvy—the detection, not only of the cases presenting classical symptoms; but also of those beginning with some pronounced or ordinarily late symptom, such as hematuria or an apparent paralysis, as well as those cases which may be regarded as incipient, *i.e.*

* Report of the Committee of the American Pediatric Society.

cases exhibiting no well-defined sign of scurvy, but which are yet of scorbutic origin, as shown by their prompt recovery under suitable treatment.

As an illustration of this type may be cited the case of _____, æt. eighteen months, who had been ailing for two weeks with general fretfulness, loss of appetite and sleep, and, for the last few days, slight fever. These symptoms had been attributed to dentition, but no teeth were erupting at the time. No digestive disturbances were apparent; nor could evidence of tenderness, beyond fretfulness when disturbed, as in moving or lifting the child, be found. A careful examination of the gums showed them to be, over the upper incisors and first molars, a little more dusky than in health; but there was no bleeding or sponginess. Inquiry into the food revealed nothing out of the way beyond the addition of four tablespoonfuls of a proprietary consumed preparation of dextrose and maltose to the 36 ounces of milk consumed daily. The proprietary food was dropped from the dietary and orange-juice advised, with a resultant return to normal conditions in a short time.

In another case, which may well be termed incipient, the baby of twelve months, fed on twice-pasteurized milk, exhibited simply pain when turned upon its left side. No changes in the gums could be seen, nor any swelling of the left thigh or other abnormality; the infant being particularly healthy-looking.

In both these cases, inquiry into the manner of feeding (bi-pasteurized milk in the last case) revealed the true nature of the affection, and led to appropriate and successful treatment. Cases of this type, I believe, are comparatively common and, being overlooked, either go on to more pronounced symptoms or recover spontaneously.

Finally, in all cases of uncertain origin, the therapeutic test is of great value in establishing the true character of the disease—namely, the stopping of the supposedly offending food and the administering of orange-juice and raw milk. Results are usually seen in from forty-eight to seventy-two hours, and always within a week.

Although not quite within the province of this paper, a word as to prophylaxis may not be out of place, to wit: Whenever we are compelled, as we sometimes are, to employ a food likely to be followed by scurvy, we should endeavor to guard against this likelihood by the simultaneous administration of orange-juice, half an ounce daily being quite sufficient, and by not continuing the scurvy-inviting food or manner of feeding for too long a period.

TRANSACTIONS OF THE NEW YORK ACADEMY OF MEDICINE.

SECTION ON PEDIATRICS

Meeting of February 12, 1914.

WILLIAM P. NORTHRUP, M. D., *in the Chair.*

CONGENITAL MALARIA.

DR. MURRAY H. BASS presented this communication in which he stated that the consensus of opinion had been that malaria was probably not transmitted *in utero*. However, during the past few years a small number of cases reported by competent observers seemed to offer incontestable proof that, though a rare occurrence, malaria might be transmitted antenatally from mother to offspring. Dr. Bass said that he would not review fully the literature of the subject because this had been done recently in this country in the pages of F. S. Meara (*Archives of Pediatrics*) and of F. Beekel (*Cleveland Medical Journal*) which appeared in July, 1909, and in November, 1910, respectively. Meara reported the case of an infant born in the middle of October at Massapequa, Long Island. The mother and father of the child had both suffered from malaria in August but had apparently been cured by quinine in the course of a few weeks. The baby appeared well at birth and remained so for ten days when it began to lose in weight and seemed to be ill. When seven weeks of age it was admitted to Bellevue Hospital where in a routine examination the blood was found loaded with malarial organisms. The child died in spite of vigorous quinine medication.

Meara from a careful consideration of the evidence offered in the literature seemed inclined to doubt the occurrence of intrauterine infection and evidently did not consider his own case as a completely proven one.

Beekel's case was one of quartan malaria in an infant ten weeks of age, born the end of September, and could not be definitely attributed to intrauterine infection, on account of the time elapsing before the child showed symptoms and on account of the absence of any history of recent malarial infection in the mother. Beekel, in a thorough search of the literature, had been able to collect eleven cases which seemed to be absolutely proven. In 1909, Dumollard and Viallet reported the case of a woman seven months pregnant who was attacked by a severe type of malaria for which she was admitted to a hospital. In spite of large doses of quinine her fever continued and in a precipitous labor she gave birth to a child which lived but one hour. The placental blood, the blood from the cord,

and the heart blood all showed numerous plasmodia of the same type as those in the maternal blood. The labor had not been attended with hemorrhage. A. Laffont reviewed this whole subject very thoroughly and added a case of his own of undoubted congenital infection and concluded: that the parasite might be transmitted from mother to fetus; that the rebellious types were not always those transmitted; that hereditary malaria might be divided into two types, (1) congenital malaria which occurred in the embryo or fetus, and (2) true hereditary malaria which attacked the fetus but developed in the new-born, the child, or the adult; that the hereditary malaria which attacked the new-born might be acute, chronic or latent, that the diagnosis might be made only by means of the microscope, and that the latent form might not show itself until several months after birth.

The most recently reported case was that of Tissier and Brumpt who, in February, 1913, reported that a woman pregnant in Algiers had an attack of malaria in January. In May, about five months later, severe chills occurred. Under the administration of quinine she became apparently well and remained so. In October she gave birth to an apparently perfectly healthy child. When nineteen days old the child developed fever of the tertian type which led to the diagnosis of malaria, which was corroborated by finding the plasmodium in the blood. The mother had removed to Neuilly, France, immediately after her attack of malaria, and the authors stated that it was out of the question that the child was infected after birth since malaria and mosquitos were unknown at Neuilly in October. They believed that the infection occurred either at birth or *in utero*.

Dr. Bass said that to these cases he wished to add a case seen in the Pediatric Department of Dr. Hill's Maternity Clinic. The baby was brought to the clinic February 19, 1913, at the age of seven and one-half weeks. The mother stated that the baby had been fretful since she was three weeks of age, had numerous green stools, vomited occasionally and had been losing weight. She had noticed no fever. The feeding had been partly breast milk and partly weak Imperial Granum mixture. The baby was pale, emaciated, weighed 6 pounds and 1 ounce, and while bright at times, at other times she appeared dazed and almost semi-comatose. The lymph nodes were all slightly enlarged, and the abdomen was slightly distended but lax. The liver was felt one finger below the free border of the ribs, the spleen two fingers below. Otherwise the examination was negative. The striking fact was the child's extreme pallor. A hemoglobin test roughly made showed a hemoglobin index of between 10 and 20 per cent. As a result of this a spread was taken and large numbers of plasmodia of the tertian type were seen in the red cells. So numerous were these that, although owing to the anemia there were relatively few cells in the microscopic field at one time, there were four or five parasites to be seen in the same microscopic field. The mother then stated that previous to her marriage, in December, 1911, she had lived on Long Island, but had moved to New York at the time of her marriage. In August, 1912, she became ill and had re-

curring attacks of fever on alternate days for about a month when she had a very severe chill. She was treated for a few days, when the chills stopped and she had had no further treatment. The baby was born in December, and was apparently well until about one month of age. Examination of the mother's blood showed 96 per cent. hemoglobin, a normal cell count, a normal differential count, and no plasmodia. The spleen, however, was enlarged and hard and two fingers below the costal margin. The child was kept at the clinic for observation. The temperature was taken frequently and it was found that the child passed the time of the chill without any appreciable rise in temperature. A complete blood count at this time showed hemoglobin 16 per cent., red cells 1,216,000, white cells 8,000, polynuclear neutrophils 13.0, large lymphocytes and mononuclears 23.0 per cent., small lymphocytes 54.0, myelocytes 1.0, transitional cells 9.0 per cent. Four normoblasts were seen in counting 100 white cells. The red cells showed marked anisocytosis. Megalocytes were numerous. There was no basophilic stippling. Quinine medication was started at once, the child receiving twenty-two doses in the course of five days. From the second day on, one-half grain of aerated carbonate of iron was administered once daily in a milk feeding. Human breast milk from another nursing mother was fed. Under this treatment the child's condition rapidly improved. On the fourth day plasmodia could no longer be found. The hemoglobin index rapidly rose so that in eighteen days it had risen from 16 to 52 per cent. After an initial loss in weight the child gained steadily up to the time of discharge from the hospital, when she weighed 6 pounds 12 ounces. During her stay in the hospital her temperature had only twice risen to 101°, each rise being evidently due to intestinal conditions. One month after discharge the baby was getting on well though the spleen was still considerably enlarged. Though it might be admitted that there was no way of definitely proving this to be a case of congenitally acquired malarial infection, the evidence all seemed to point toward that conclusion; for it was incredible that in that portion of New York City where the patient lived, 120th Street, there should have been mosquitos capable of transmitting the disease in the midst of winter.

To this case may be added another. About eight years ago a woman who had suffered from malaria some time previously gave birth to an apparently healthy child. Plasmodia having been found in the mother's blood, that of the infant was examined immediately after birth and the plasmodia were found. After a few doses of quinine these parasites disappeared.

It was well known that malarial infection might remain latent for a considerable length of time in the adult and the essayist said he could see no reason why this could not have occurred in the case he had reported. He thought this case could be considered a true case of congenitally acquired malaria in view of the fact that postnatal infection seemed to be positively excluded. Several months after the child, whose case was so fully reported, was taken suddenly ill

with symptoms of acute intestinal intoxication and died in convulsions within twenty-four hours. The only abnormality in the gross findings was a very large thymus. There was no hyperplasia of the lymphoid tissues at the base of the tongue or in the follicles of the intestinal tract. The spleen was normal in size and consistency and the mucosa of the intestinal tract showed no injection or erosion. Microscopically the liver showed a slight grade of beginning diffuse necrosis, the kidneys a moderate acute nephritis, and the spleen revealed some hyperplasia of the Malpighian bodies and considerable pigment through its substance. No malarial parasites were found in the spleen.

Dr. Bass called attention to the fact that in all the reported cases the babies were healthy at birth and this did not speak in favor of infection during pregnancy but rather in favor of the infection occurring during labor; however, they were not as yet in a position to say definitely how the infection of the offspring took place.

DISCUSSION.

DR. HERMAN SCHWARZ said that in examining the blood of children on account of anemia he had become interested in this subject. In looking up the literature he found that a man from Edinburgh had reported two cases of congenital malaria and gave as one of his reasons for believing the malaria congenital "chills in utero." This seemed a little far fetched. The writer had found plasmodia in the blood of the infants soon after birth.

DR. FLOYD M. CRANDALL said that it certainly seemed strange that if the congenital transmission of malaria was possible that it did not occur more frequently, still the evidence of the reader of the paper in the case presented was pretty positive and went to prove the possibility of such transmission.

In a case which he had reported many years ago, he believed in 1892, everything in the clinical history and findings seemed to give positive proof of the congenital origin of the disease. In this case the mother had had a paroxysm and the child had been born during the sweating stage. The following morning the child appeared to be all right. In the afternoon, eighteen hours after birth, it appeared blue and pinched and it was thought that the child was dying when he was sent for. He found that the child had a temperature of 102° F. The same thing occurred the following day, and the child had four successive attacks each lighter than the preceding one. In those days they knew little of the plasmodia or of blood examinations, but he had attended a meeting where he had heard Dr. Walter B. James present a paper on the subject and he took blood cultures and had them examined on the third day and the plasmodium was found in the blood of both mother and child.

Dr. Crandall said that he did not see, all things being considered, how the case could be other than a congenital one.

DR. CHARLES HERRMAN said that twelve years ago he had seen a case which he believed to be congenital malaria in the Iatlian Colony

in Harlem, known as "Little Italy." The mother had recently come from Italy and gave a clear history of malarial attacks. The baby was three weeks old. It did not have distinct chills, but had attacks of cyanosis followed by fever. Plasmodia were found in the blood, and under quinine treatment the attacks disappeared. Although one could not be absolutely certain, the case was in all probability congenital.

DR. WILLIAM P. NORTHRUP said that he recalled the case of a baby a few weeks old that had supposedly malaria. The child was given 10 grains of quinine and it lived.

TROPICAL DISEASES IN CHILDREN.

MAJOR FREDRICK F. RUSSELL, U. S. A., said that children's diseases in the tropics were very similar to those in this latitude with a few noteworthy exceptions. Diphtheria, scarlet fever, mumps, and whooping cough were not common. Measles was more often seen, and chicken pox was quite prevalent. In most places in the tropics smallpox was so general that it was practically a disease of childhood. The more frequent diseases were the diarrheas and dysenteries, eczema, furunculosis and prickly heat, malaria in all its forms, infections with intestinal parasites, and above all syphilis, both acquired and congenital. In the far East they had also beriberi, yaws, and at times cholera and plague. From the practical point of view infections with intestinal parasites were the most important, not that they were directly the cause of serious diseases but because of the harm to the general health. Tropical cities with but few exceptions were backward in sanitation and had much the same sort of infestations as were noted here fifty or sixty years ago before the cities of the north were provided with sewer systems. The circuit followed by intestinal parasites from man to man was quite direct because of the custom of using human ordure as a fertilizer for green vegetables. The commonest worm was the *Ascaris lumbricoides*, and almost every native up to middle life was infested. It was customary to administer santonin and calomel to children about twice a year as a routine measure. Although round worms produced no specific disease, when the little patient harbored one or two hundred of them, the effect on the general health was considerable. A striking demonstration of the influence of helminths on the general health was shown clearly in the Bilibid prison in Manila. For years the death rate from all causes had been high and sanitary reforms had not brought about the expected improvement. Examination of the feces for ova showed the presence of one or more helminths in the majority of the prisoners. Following the general use of anthelmintics, the sick rates from all causes showed a remarkable improvement.

The most important nematode among children was the hookworm, *Anchylostoma*, or *necator americanus*. In countries where it was prevalent, almost every native child was infested, and the child suffered in extreme degree from the resulting anemia and digestive

disturbance. A point worthy of emphasis in regard to helminths was that the carrier state was frequently encountered absolutely without symptoms. The carrier state might be partly due to the development of immunity, but more often it depended upon the small number of helminths present.

Oxyuris vermicularis was rather more prevalent in the tropics than in the temperate zones. The tape worms and flukes were also found but the only one of importance was the dwarf tape worm, *hymenolipis nana*, which occasionally existed in the most unbelievable numbers, producing a multitude of symptoms. The almost universal presence of helminths made the examination of the stools of more importance than the examination of the urine. It was absolutely essential, therefore, to have some workable system of collecting and examining feces. The specimen did not need to be quite fresh unless examination was to be made for entameba. In Porto Rico the natives had been so instructed by Ashford that a patient seeking advice always took along a specimen of feces in a match box. Aside from the strictly human parasites, those of the dog and pig were frequently found in children. The question of prevention of infection and reinfection was important and involved the instruction of all families in personal hygiene. The duration of life of most of the parasites was short, one or two years at the most, and if reinfection could be prevented they would disappear from the tropics as they had from the north.

Malaria was of great importance in children, both because they could not protect themselves from mosquitos, and because their thin delicate skin made infection from the mosquito easier. The prevalence of malaria among children gave a ready index to the amount of malaria in the district, as had been pointed out by Koch. The malarial index was readily ascertained by noting the percentage of children with easily palpable spleens. All varieties of malaria occurred and the clinical course was more often atypical than not. For this reason relapse followed relapse until the disease might well be called chronic. Examination of the blood for malaria must in the tropics be also a routine procedure.

Syphilis in the tropics, especially in seaport towns, was extremely common and compared to the disease in the north seemed quite mild and amenable to treatment.

Yaws, the younger sister of syphilis, was more interesting. It was a chronic, specific, infectious disease, characterized by an eruption of strawberry-like tubercles and more or less constitutional disturbance. The West Coast of Africa was probably the original home of the disease, from whence it was carried to the Spanish Indies by negro slaves. It was caused by the *treponema pertenue* of Casrellani, an organism morphologically indistinguishable from the spirochete of syphilis. It had been shown, however, that yaws was a distinct disease entity and not a form of syphilis. The most interesting point about the disease at present was its successful treatment by salvarsan, one dose usually bringing about a complete cure; in fact, the results obtained by salvarsan in yaws might be said to surpass

those obtained in syphilis. Since the introduction of treatment by salvarsan into the yaws hospitals in the West Indies these institutions which had been crowded with patients for hundreds of years were now for the first time closed.

One of the most interesting and important diseases of the East was beriberi, and for years an infantile form had been recognized in breast-fed infants. It was a disease of metabolism associated with a deficiency of certain unknown elements of the food and characterized clinically by multiple neuritis, dropsy and tenderness, wasting and paralysis, of the muscles, including the heart muscle. The symptoms of a typical case in an infant were as follows: A young infant of two or three months, previously healthy and well nourished, was suddenly seized with paroxysms of pain, during which it straightened out the body and became rigid, the abdominal walls and epigastrium becoming tense and hard. The child cried constantly; the face became cyanosed, and the neck veins turgid. The pulse was small and hard. The paroxysm passed off only to recur time and time again until death supervened, usually within a few days or hours. A chronic form with gradual onset and sudden termination was also seen. An autopsy the same lesions were seen as in adults. There was extreme dilatation and hypertrophy of the right heart, hydropericardium, degeneration of the vagi and of the cells of the right cervical ganglion, and in most cases extensive subcutaneous edema. The singular point about this disease was the high mortality among breast-fed children. In 1909, 65 per cent. of the infant mortality was among breast-fed children and only 20 per cent. among those artificially fed. Fifty-six per cent. of the total infant mortality of Manila had been caused by this disease. It had been shown that beriberi was caused by highly milled white rice and this gave the key to the treatment of the disease in infants. An alcoholic extract of rice bran was prepared and fed to the children the breast feeding being continued. The improvement was marked and immediate; vomiting stopped within twenty-four hours and the pain and sleeplessness disappeared. At the end of a week or less the patients were practically cured. Chamberlain and Vedder had demonstrated conclusively that beriberi was not an intoxication but was a deficiency disease. Its eradication was now only a matter of time, and of educating the rice-eating peoples to select the proper sort of rice.

Tetanus was common everywhere in the tropics, so prevalent indeed, that one had to be very careful even in giving a hypodermic of morphine.

All the bacillary forms of dysentery were also common; the same organisms were found throughout the world and the symptoms were not different from those seen in the dysenteries in this country. Amebic dysentery was also seen but not so commonly.

Bilharziasis infection was common in China, Japan and the Philippines. The principal habitat of the worms was in the portal vein, from whence they descended to the rectum and the bladder and worked their way through the walls of the intestines and lesions were

produced which sooner or later proved fatal, as there was no known efficient anthelmintic for this disease.

The strongyloides was of no particular importance except as an indication of the hygiene of the people.

Kala-azar was found in both children and adults and was characterized by great emaciation, enlarged spleen and liver, and often edema of the lower extremities. It ended fatally. The parasite causing the disease is known as the *Leishmania donovani*.

In speaking of the bubonic plague the essayist said the bubo in children was usually found at the neck but it might be found in the femoral region, at the elbow, the wrist or elsewhere.

A new interest had been awakened in amebic dysentery since the introduction of emetine. After five to ten doses of emetine given over four or five days there was an apparent cure, but most of the cases relapsed. In a patient who was gaining and had normal movements they frequently found enormous cysts in various stages of development. These cysts were from apparently normal stools and developed four nuclei; as long as they persisted treatment must be continued.

This paper was accompanied by an interesting lantern slide demonstration.

DISCUSSION.

DR. WILLIAM P. NORTHRUP said that the paper had been exceedingly interesting and that he had been especially interested during the reading in noting the resemblance of beriberi to scurvy.

DR. W. T. LONGCOPE said that he should like to know how the diagnosis of the cyst form of the ameba in the stools could be made with certainty. In the fresh state there must be considerable difficulty in differentiating the cyst forms from epithelial cells and since it was possible that these encysted amebæ might be present in certain unexplained cases of chronic diarrhea in this locality, it seemed important that we should know exactly how diagnosis of these forms might be made.

MAJOR FREDERICK F. RUSSELL replied that the diagnosis of the cysts of amebic dysentery was not difficult if one used the staining method of Schaudinn. Of course it took some experience but no epithelial cell had a nucleus like that of the cysts. The nucleus of the epithelial cell was larger and never multiple.

PELLAGRA IN CHILDREN.

DR. W. J. MACNEAL, in the absence of Captain Joseph F. Siler, gave this talk which he illustrated with lantern slides. He said that pellagra was not a very important cause of serious illness or death in children, but the common occurrence of this disease in children was a very important feature of the general problem of pellagra. With regard to the manifestation of the disease in children, the skin

lesions were similar to those in adults and were well marked. The gastrointestinal symptoms, pain and acute or subacute inflammation of the digestive tract, were found in children as in adults. The involvement of the nervous system was, however, not so marked in children as in adults. One seldom saw the toxic psychoses that were met with in adults. In showing illustrations of the lesions, Dr. MacNeal called attention to the tendency of the lesions to girdle the wrists and said that the statement had been made that when this occurred the patient would die. He also called attention to the bilateral symmetry of the lesions and to the fact that they were more extensive where the skin was exposed to the sunlight. Absence of sunlight did not inhibit the progress of the lesion but delayed it. In children the feet were more commonly involved than in adults. When the lesions ceased to progress there was an increase in the severity of the gastrointestinal condition and of the general toxemia. Dr. MacNeal said that he would not confine himself to pellagra as it occurred in children but would consider the general subject of pellagra. In a population of 6,600 people in endemic foci of the disease in South Carolina, there were 882 females and 1005 males under ten years of age. During the two years, 1912 and 1913, there developed in this population 91 new cases of pellagra and of these 23 new cases occurred in the female children and 25 in the male children. A statistical study of the food used in six villages, including about 5,000 persons, failed to reveal any consistent relationship between the use of any particular food and the occurrence of pellagra. A somewhat similar study of the location of domicile of old cases of pellagra in relation to domicile of the remaining population in these mill villages had shown that new cases of pellagra developed almost exclusively in persons living in the same house with such antecedent cases or in houses next door to them. In more than one-half the instances of next door relationship a child under the age of twelve years was involved, either as the antecedent or as the incident case. The disease spread therefore from a preceding case as a center, a phenomenon that could be satisfactorily explained in their opinion only by assuming that pellagra was an infectious disease. Apparently it was not readily transmitted to any considerable distance. In the transmission from family to family the children seemed to play an important part.

DISCUSSION.

DR. WILLIAM P. NORTHRUP said that the reference to the saying that when the lesion of pellagra encircled the wrist the patient was going to die reminded him of some of the first information he had had about shingles in his student days. It was said that if the shingles went all the way around the body the patient would die; as a matter of fact they never did go all the way around.

DR. W. T. LONGCOPE said that he felt he had learned more concerning pellagra during the evening that he had even known before. Dr. MacNeal's interesting and clear presentation of the work of the

Commission and the charts and slides, that represented so much careful work, truly put the position of the whole subject in a new and absorbingly interesting light. Before hearing this report it had occurred to him, as probably to many others, that there were many points of close analogy between beriberi and pellagra, but this idea had been entirely dispelled by the convincing presentation of Dr. MacNeal. Certainly this work left little basis for the old assumption that pellagra was associated with the ingestion of spoiled corn. Dr. Longcope asked Dr. MacNeal whether one would be justified in making the diagnosis of pellagra when skin lesions did not exist, and also whether he had observed the development of pellagra in suckling infants.

DR. ALVAH H. DOTY said that his experience with pellagra was limited and that he had learned more to-night than he had before known regarding this disease. He had always believed that pellagra like beriberi was due largely to improper food and malnutrition. While malnutrition might not be a factor in the early stage of the disease, he thought it played an important part as the disease advanced. All would be interested to know the true origin of the disease.

DR. WILLIAM P. NORTHRUP asked about the popular beliefs regarding the disease. What was the opinion among the people?

DR. W. J. MACNEAL did not know whether he could answer all the questions asked, but he would make the attempt. If he should omit anything he would be pleased to have the question repeated, inasmuch as he had not made written notes of the discussion.

As to the diagnosis of pellagra without skin lesions: In the work of the Thompson-McFadden Commission, no cases were accepted as definite pellagrins unless the skin lesions had been observed either by themselves or by a local physician. Skin lesions might be present in a typical form for only a few days in some cases, so their absence did not negative a diagnosis of pellagra. Cases often went for months without skin lesions and one could exclude pellagra just because the skin lesions had not been seen.

In regard to the question of an insect carrier or a secondary host of the parasite of pellagra: This subject had been carefully studied by Mr. A. H. Jennings and Mr. W. V. King, of the Bureau of Entomology, United States Department of Agriculture, working in collaboration with this Commission. Dr. Sambon, of London, had stated that pellagra was contracted chiefly by field workers and he had incriminated the buffalo gnat (*Simulium*) in its transmission. Jennings and King observed that the disease was contracted chiefly by persons remaining in or about the dwelling house in the day time and they had suggested that the stable fly (*Stomoxys calcitrans*) might play a role in its dissemination. The evidence, however, was inconclusive.

The methods used for disposal of sewage seemed to have something to do with the spread of pellagra. In those portions of the city of Spartanburg equipped with a water carriage sewer system, relatively few cases of pellagra developed, while in those parts of the city where

surface privies were used there were many more cases of this disease. The relationship was suggestive but not clear-cut, for even in the sewered districts some houses were still provided with surface privies. In order to get more definite observations on this point an attempt was made to find mill villages with complete water carriage sewer systems. With the assistance of the State Board of Health three such villages were located. At one of these the sewer system had been in operation only one year so it seemed of no value for this purpose. In the second village the system had been in use for three years and during that time no new cases of pellagra had originated there. In the third village the water carriage sewer system had been in use for twenty years. A number of cases of pellagra had moved into this village from time to time but no new cases could be proven to have originated there. In one of the visits to this village, the Commission was accompanied by Dr. Sambon, and after examining the situation he agreed with this conclusion.

In regard to treatment of pellagra: No specific was offered, but very good results had been obtained in several cases. The important therapeutic measures included removal of the patient to a cooler climate or provision for comfortably cool temperature in his room, careful but full feeding with plenty of milk and eggs, scrupulous cleanliness, efficient nursing and cheerful optimism on the part of everyone around the patient. Fourteen cases of pellagra brought to the New York Post-Graduate Hospital in 1912 were treated along these lines and all of them recovered from the acute manifestations of the disease, although most of them relapsed the following year after returning to their previous environment. In 1913, observations were made upon the treatment of a number of cases in a hospital in the South. Different methods of specific treatment were tried on these cases, but several deaths occurred nevertheless. Personally, Dr. MacNeal was opposed to the use of arsenic or other supposed specific treatment during the active stage of the acute attack, but this opinion was not shared by the other members of the Commission. Salvarsan had been used in treatment but there would seem to be no real justification for its employment.

In reply to the question as to whether he had seen any cases of pellagra in suckling children, Dr. MacNeal said that he had not seen such cases. Such cases have been reported on reliable authority, however. Among the cases on the records of the Thompson-McFadden Pellagra Commission there was none less than one year old.

REVIEWS.

EPIDEMIC INFANTILE PARALYSIS (HEINE-MEDIN DISEASE). By PROF. PAUL H. ROMER, Principal of the Institute of Hygiene and Experimental Medicine of Marburg. Translated by H. Ridley Prentice, M. B., B. S. LOND., M. R. C. P. With 57 Illustrations. Price \$2.75 net. William Wood and Company. New York. 1913.

This exceedingly interesting monograph contains a timely presentation of a pediatric subject that is daily demanding greater attention. From having been a disease of sporadic occurrence we now find it quite epidemic in its manifestations and it is only within recent years that the experimental investigation of poliomyelitis in animals have afforded a clue as to its etiology and treatment. The author brings together in an orderly manner the mass of scattered material which is to be found in the literature of all countries and much of which is accessible only with difficulty. Römer takes up in succession the symptomatology, etiology, pathology and treatment of the disease, paying particular attention to the question of immunity and immunization. It is clearly demonstrated that a comprehensive description of this disease is quite impossible and notwithstanding the remarkable advances which have been made, there is still a great deal to be determined regarding the same. The clinical aspects of the problem may now be regarded as having been investigated almost in their entirety, thanks to the work of Heine, Medin, and Wickman. One of the most important gaps which remains to be filled, however, is a certain means of early diagnosis. The author calls attention to the studies of Müller in this connection, who calls attention to the fact that marked perspiration, hyperesthesia, and leukemia are important features. Römer regards the study of the disease quite complete from the biological point of view although the question of the pathogenesis of the disease remains obscure and debatable. The main object of the book has been to bring forward proofs that the method of experiments with animals is able not only to confirm the results obtained by the older methods of investigation, but also to throw fresh light upon them and to yield new results. Unfortunately the only animal that is suitable for the experiments, the monkey, is possessed of peculiar characteristics which interfere to some extent with its more universal employment. A very complete bibliography is appended to this book which is worthy of the attention of every pediatricist.

AIDS TO THE DIAGNOSIS AND TREATMENT OF DISEASES OF CHILDREN. By JOHN McCaw, M. D., R. U. I., L. R. C. P. Edin. Fourth Edition. Price \$1.25 net. William Wood & Company. New York. 1913.

The fourth edition of this very excellent little book has been brought up to date by including as new matter such important subjects as epidemic cerebrospinal fever, mental deficiency, cerebral

diplegia, infantile hemiplegia, the myopathies, night terrors and status lymphaticus. Being printed on thin paper in small type it is possible to include in only 400 pages a very complete description of the subject. A number of prescriptions are appended to the work some of which may be criticised as containing too many ingredients, it being the tendency to make prescription writing at the present day as simple as possible.

THE DISEASES OF CHILDREN. By HENRY ENOS TULEY, M. D. With 106 engravings and 3 colored plates. Second Revised Edition. St. Louis, 1913. C. V. Mosby Company.

This book aims to fill the needs of the general practitioner and student for a book on pediatrics. The usual classification is followed and the etiology, pathology, symptoms, prognosis and treatment are given in detail under the names of the various diseases. The chapter of greatest interest is naturally that on infant feeding, a subject which notwithstanding all the attention that has been given to the same, is still apparently not as definitely established as might be. Ideas about milk mixtures, etc., have varied greatly in recent years and fortunately the tendency is to the adoption of the simplest methods. The author presents the various milk modifications in considerable detail which unfortunately contributes somewhat to the confusion of the reader. He favors the short nursing intervals for babies and does not refer to the practise now very extensively adopted of having the nursing intervals extended to three or four hours. It has been quite conclusively shown that this is a very satisfactory procedure.

A color plate of particular interest is introduced which shows very well the so-called Koplik's spots in the mouth. The book as a whole presents a very satisfactory description of this important branch of medicine.

CASE HISTORIES IN PEDIATRICS. A Collection of Histories of Actual Patients Selected to Illustrate the Diagnosis, Prognosis and Treatment of the Most Important Diseases of Infancy and Childhood, with an Introductory Section on the Normal Development and Physical Examination of Infants and Children. By JOHN LOVETT MORSE, A. M., M. D. Associate Professor of Pediatrics, Harvard Medical School; Associate Visiting Physician at the Infants' Hospital and at the Children's Hospital, Boston. Second Edition. Octavo, 640 pp. Illustrated. Price \$5.50. Boston: W. M. Leonard, Publisher, 1913.

In the belief that the teaching of medicine by the presentation of case histories is superior to recitations and quizzes, a number of subjects have been treated in this manner by members of the Harvard Medical School. Among them the collection of histories to illustrate the subject of pediatrics has met with very wide attention, and Professor Morse's book now appears in its second edition with double the number of histories. An introductory section on the normal development and physical examination of infants and

children has been added. This is of considerable value because it aids in the study and analysis of the succeeding cases histories. The criticisms made of the first edition, that the diagnosis was not given at the head of each case, is not supported by Dr. Morse, who claims that as the main object of the book is to present a series of problems to be solved by the reader, this object would be defeated if the diagnosis was stated in the beginning. A series of 200 cases has been presented which are completely indexed so that they may be readily referred to. The entire domain of the diseases of children is included, beginning with those which are found in the new-born infant and taking up in turn the diseases of the alimentary, respiratory, circulatory, nervous, and genito-urinary systems, with special sections devoted to specific infectious diseases and the blood. There is also a concluding section on various unclassified diseases. In each instance the previous and present histories are carefully stated, followed by the physical examination, diagnosis, prognosis and treatment.

BRIEF OF CURRENT LITERATURE.

DISEASES OF CHILDREN.

The Congenital Pointed Skull.—Herman Kuttner (*Münch med. Woch.*, Oct. 7, 1913) describes the pointed skull as being rare as a congenital condition. It results from a premature closure of the sutures of the skull, which must take place during intrauterine life. The parietal bones come to a point; the forehead rises abruptly perpendicular; the nose is depressed; and the eye sockets are very shallow, so that exophthalmos is produced. The sagittal and coronary sutures become ossified and there is no trace of the anterior fontanel. During the first year there are important disturbances of the brain and optic nerves due to internal pressure. The first case observed by the author lived to be a year and two months of age. It never attempted to sit up or to speak. The tongue was too large and interfered with swallowing. The child was born with forceps. The body was normally developed. The region of the anterior fontanel was prominent forward and the fontanel was closed at birth. There was exophthalmos and the optic nerves were seen to be atrophied. To relieve pressure the skull was trephined on both sides, the bone being found very thin. The child died of aspiration pneumonia. The second case was a year old girl. There was a cleft palate with partial harelip. There was no indication for operation since there was as yet no disturbance of the optic nerves. Of twenty cases observed by Meltzer all appeared between the first and sixth years; none were congenital. Seven showed no anomaly at birth; the others had somewhat high skulls. Visual disturbances began at from three months to three years. Powers describes one congenital case which died when thirty days old. The corneæ

were ulcerated because the lids could not cover them. The chief danger is to the sight by atrophy of the optic nerve from pressure. There is some difference of opinion as to whether the optic canal is so small as to exert pressure upon the nerve. Some authors see the cause of the atrophy in a basal meningitis. The author believes it to be due to intracranial pressure. The only therapeutic measure of value is trephining before incurable atrophy has taken place. Ventricular and lumbar puncture can have only a temporary effect.

Functional Test of the Kidney in Scarlet Fever.—M. Fishbein (*Jour. A. M. A.*, 1913, lxi, 1368) has employed the phenolsulphonephthalein test in thirteen cases of scarlet fever. He finds that there seems to be a general lowering of the renal function during the later stages of scarlet fever. In nearly all uncomplicated cases examined from the third to the fifth week a total output averaging 55 per cent. was observed as compared with a normal of 65 per cent. to 85 per cent. In the instances of acute nephritis, an increased output was observed in two, a lowered output in one. In several instances in which headache and nausea occurred, although no albumin was found in the urine the test showed a decreased function of the kidney.

Treatment of Umbilical Hernia.—J. Fraser (*Lancet*, Sept. 27, 1913) has treated twenty-one cases of umbilical hernia in children by the subcutaneous elastic ligature. The operation is not performed upon children below the age of six months, and in the majority of cases it is of advantage to wait until the child is one year old. An opening large enough to admit the tip of the little finger is considered unsuitable for this form of treatment. The essential material is a piece of elastic cord one-eighth of an inch in diameter and about 3 inches long. Three small incisions are made at equal intervals around the periphery of the sac, penetrating the skin and subcutaneous tissues only. Through these, with a blunt dissector, the tissues around the pedicle of the sac are undermined and the elastic ligature is pulled beneath the skin, following the track of separation. The operator, having satisfied himself that the sac is empty, pulls the ligature as tightly as possible around the pedicle of the sac and fastens it so with a stout piece of silk. The ligature is allowed to remain in position for six days and then removed by cutting the silk knot. The operation is most simple. The after-treatment is brief and satisfactory; and the cure is apparently permanent.

Wassermann Reaction.—During the past year out of a large series of mothers with congenital syphilitic babies whose blood was tested, W. P. Lucas (*Arch. Pediat.*, 1913, xxx, 747) found that 70 per cent. of the mothers gave positive reactions of the blood, the infants having active syphilis. Of these, 44 per cent. died during their first year. None of them were entirely breast-fed. The 55 per cent. that lived were either wholly or partially breast-fed and only one of these was not doing well under combined medicinal treatment and breast milk. A syphilitic mother with a negative reaction, that is, a mother suffering with latent syphilis, may give

birth to a child with a negative reaction, who may have no symptoms at any time except perhaps that indefinite symptom of nervousness. She may give birth to a child with parasymphilitic or late syphilitic manifestations, or she may give birth to a child with positive Wassermann reaction and active syphilis. The syphilis in these cases is usually not as active as in the cases where the mothers react positively, as well as the infants, and from this standpoint the Wassermann reaction has considerable prognostic value.

Gastric Secretion of Infants at Birth.—The study of A. F. Hess (*Amer. Jour. Dis. Child.*, 1913, vi, 264) included a gastric examination of fifty-five infants, varying in age from one-half hour to eighteen hours. He found that new-born infants regularly secrete a considerable amount of hydrochloric acid before they are given any food. Among fifty-two infants varying in age from one-half hour to eighteen hours, only one did not have hydrochloric acid in the stomach; in all but one instance free acid was obtained. The hydrochloric acid varies greatly in amount. Exceptionally it was found almost lacking on repeated tests (congenital hypochlorhydria or hyposecretion), or very profuse (congenital hyperchlorhydria or hypersecretion). In almost all cases acid was obtained throughout prolonged tests, in spite of the fact that food was not given to stimulate secretion. In one instance 17 c.c. of highly acid juice was aspirated in one hour and fifty minutes. Rennin, pepsin and lipase were also obtained in the (unfed) new-born. Prevailing physiologic views cannot account for the gastric secretion immediately after birth. It is not the result of mechanical stimulation by means of the catheter, as the juice was obtained immediately on the introduction of the tube, without an intervening latent period. It may be prenatal in origin. Nor is it clear what stimulates the continued secretion which was obtained for hours. Experiments showed that the saliva is not the exciting agent; the effect of sucking could not be determined. Comparative tests of the same infants at birth and later, during the first week of life, showed that the stimulus to gastric secretion may be greater in the new-born infant which has not been fed. This chlorhydria of the new-born is not usually associated with increased tonicity of the pyloric sphincter, as the duodenal catheter can readily be passed through the pylorus. Even when 0.4 per cent. hydrochloric acid is instilled into the gastric cavity the catheter can be readily passed into the duodenum. However, the high acidity may at times be related to the pylorospasm or to duodenal ulcer met with in infancy. Although gastric secretion is so marked in the new-born, duodenal and pancreatic secretion is very scanty. Nor can this secretion be readily stimulated by allowing hydrochloric acid to enter the duodenum. Evidently the mechanism of pancreatic secretion is not as easily activated in the new-born as in later infancy.

Use of Tuberculin in Surgical Tuberculosis.—C. G. Swenson (*Surg., Gyn. and Obst.*, 1913, xvii, 437) says that tuberculous gland infections that have not entered the stage of caseous degeneration yield to tuberculin treatment. Tuberculin injections may be safely given every tenth or twelfth day without opsonic work; of course

it is preferred that one be guided by occasional blood tests. The best place for the injections is on the anterior part of the chest. The duration of tuberculin treatment should be one-half to two years. All hygienic treatment, such as fresh air, good food, and attention to digestive organs, is of vital importance. For tuberculous sinuses extending into the urinary bladder the bismuth paste injections are usually contraindicated.

Dried Milks and Patent Foods in Infant Feeding.—E. Pritchard (*Pediatrics*, 1913, xxv, 632) describes methods of preparing three varieties of dried milk. He states that different varieties of dried milk have different properties and are suitable for different classes of cases. Dried milks are free from pathogenic germs, and consequently safer than natural milk. The cost of reconstituted dried milk is the same as dairy milk, but if separated dried milk is used and fortified with a cheap substitute fat (Marylebone cream, an emulsion of linseed oil), the food thus constituted is the cheapest that can be employed and the results are excellent. Proprietary foods are expensive and do not accurately conform to the standard of breast milk. To obtain the best results with dried milks they must be modified to the required standard—a standard which differs in the case of different infants. This is easily accomplished by varying the dilution and adding varying proportions of additional fat and sugar.

Intestine as a Pathway of Infection to the Tubercle Bacillus.—In view of the great divergency of opinion regarding the question as to whether the healthy intestinal mucosa is pervious to the tubercle bacillus, L. Findlay (*Med. Press*, Oct. 29, 1913, 471) has carried out a series of experiments with cultures of the bacilli suspended in oil and placed in a gelatin capsule, which was slipped just within the nozzle of a stomach-tube and ejected by forcing a stream of water through it after its passage. It had been previously found that the introduction of an emulsion of the bacilli by the stomach-tube almost invariably gave rise to insufflation tuberculosis, and any abdominal operation for its introduction directly into the stomach allowed of infection of the peritoneum. His results show that healthy rabbits can be infected by the ingestion of large amounts of bovine tubercle bacilli. The bacilli can pass through the apparently intact intestinal mucous membrane and reach the mesenteric glands within a period of six days; this, however, does not frequently happen. When infection occurs the intestine is invariably the seat of lesions, and thus tuberculosis of any organ, other than the intestine, is always a secondary infection when the bacilli have entered by the intestinal route. Catarrh of the intestine does not favor the passage of the tubercle bacillus through the wall, but allows of a more constant, and also of an earlier and more widespread infection of the bowel, and in this way facilitates dissemination. Healthy rabbits apparently cannot be infected by the ingestion of large amounts of the human tubercle bacillus. Rabbits just recovered from intestinal catarrh developed tuberculosis after the ingestion of human tubercle bacilli. With the human type of organism a local lesion, though always present, may be slight in compari-

son with the diseased foci in the mesenteric glands and lungs. It would seem that the best means of combating the spread of bovine infection in childhood—until tuberculosis of cattle is eradicated—is in the avoidance of everything likely to cause intestinal catarrh, and the use of sterilized milk.

Vulvovaginitis in Children.—R. M. Smith (*Amer. Jour. Dis. Child.*, 1913, vi, 355) says that it is possible to find the source of infection in the majority of cases of vaginitis in children. The outlook for cure of the individual patient is good, provided the treatment is followed. To prevent the spreading of the disease, parents must be made to realize the contagiousness of the condition and the dangers in the neighborhood to which their children are subjected, provided they are not protected during the long hours of play. The frequency with which feeble-minded children act as centers of infection gives an additional argument for their isolation. The treatment of the individual patient as she presents herself for our care remains our first duty, but if we do nothing more we can hardly expect to make much of an impression on the disease as it exists in the community.

Heat and Summer Diarrhea.—J. Zaliorsky (*Amer. Jour. Dis. Child.*, 1913, vi, 289) discusses this subject on the statistical basis. He shows that the mortality of summer diarrhea is practically the same all over the United States. The only marked exceptions are certain cities on the Western Coast. The mortality of diarrheal diseases is twice as high in the summer as in the winter. A room temperature of more than 85° F. has a detrimental influence on the sick baby. Hyperthermia may be produced in infants when the day and night temperature is more than 85° F., but this thermic fever does not produce diarrhea nor appreciably raise the mortality rate. Summer diarrhea is not the effect of high atmospheric temperature alone, but it cannot as yet be denied that excessive heat may lower the tolerance to carbohydrates and other elements of food. We must seek the cause of summer diarrhea (1) in microorganisms whose virulence and activity may be increased in the summer; (2) in endogenic or ectogenic toxic substances of unknown nature.

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ORIGINAL COMMUNICATIONS

EXPERIENCES WITH SPINAL ANESTHESIA IN PELVIC SURGERY.*

BY

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It may be stated as an undisputed fact, that in the great majority of cases requiring surgical treatment, general inhalation anesthesia has been satisfactory, and will undoubtedly remain so, especially the combination of nitrous oxide, ether, and oxygen.

There are, however, certain conditions in which a general anesthetic may be undesirable or dangerous. These are: (1) cardiac, pulmonary, or renal lesions, of such a nature that general anesthesia will embarrass or injure the circulatory, respiratory, or urinary systems. (2) Toxic states in which the excretory organs have already been taxed to their utmost, and the addition of another poison will mean excretory insufficiency.

There is no need to detail the objections which may be urged against ether, chloroform, nitrous oxide, and oxygen, or combinations of them under these circumstances. We are all familiar with their merits and their demerits.

When operation is imperative or highly desirable in patients who are unfavorable subjects for general anesthesia, we naturally turn to local anesthesia, *i.e.*, the concentration and limitation of the anesthetic substance, whatever it may be, to the operative area, so that analgesia is produced, and yet the drug has little or no general influence.

Without going into a discussion of local anesthesia, it can at once be said that for pelvic operations in which full relaxation of the ab-

*Read before the Philadelphia Obstetrical Society, February, 1914.

dominal wall is required, the infiltration of the operative area with anesthetic solutions is unsatisfactory.

This leads us more or less logically to spinal anesthesia, really a form of local anesthesia, but that form in which the anesthetic drug is applied directly to the root of the nerves instead of to their peripheral branchings. It seems, *a priori*, that much less of any drug would be needed if concentrated at such a point, and that the anesthesia would be much more complete.

Spinal anesthesia would therefore appear to deserve a fair trial, and the decision as to whether we endorse it or not, depends upon its effectiveness as a method of analgesia contrasted with the difficulties and the dangers attending its administration.

In a successful case of spinal anesthesia, we have an anesthetic drug mixed with the spinal fluid, bathing the motor and sensory roots of the cord at and below an elected point, with motor and sensory paralysis of the areas supplied by those nerve roots, in other words, a loss of pain in the operative area, and full muscular relaxation.

Theoretically at least, there is little more to be desired. In its actual practice, however, we must take into account: (1) the comfort of the patient before, during, and after the operation, (2) the difficulties of administration, (3) the degree and duration of the analgesia, (4) the immediate danger, (5) the remote danger.

My own experience comprises thirty-six cases. In every instance the condition of the patient, or the requirements during operation, made general or local anesthesia undesirable.

Comfort of the Patient.—The patient is prepared for the introduction of the anesthesia by a dose of morphia (gr. 1/6), and scopolamin (gr. 1/150). One dose usually is sufficient, but if the patient is very nervous, it may be repeated. To some patients I have given bromide or veronal the evening before, to secure a good night's rest. If the preliminary injections are given at least an hour before the time set for operation, if the patient's ears are lightly plugged with cotton, if a bandage is placed over the eyes, and she is kept in a quiet room, she usually approaches the operation in a drowsy condition, or is actually asleep. In one or two patients, even a large dose of morphia (gr. 1/2), failed to have a sedative effect. Possibly the scopolamin may have had something to do with this condition.

Patients usually do not complain much of pain from the insertion of the needle. In fact, the only part of the injection which seems to give distress, is the puncture of the skin. I do not know of any patient who afterward complained of having had this done. During operation in a successful case, the patient does not suffer from pain, and many slept quietly. Often she is partly awake and can be

engaged in conversation. Sometimes shortly after the injection there is a little nausea, but this usually disappears without any treatment, except elevation of the head. The patient occasionally has the sensation of touch without the sensation of pain. It is not advisable to ask the patient whether she is suffering from pain; she will complain of pain quickly enough, and in apprehensive persons, simply the sensation of touch may be magnified into real pain. Occasionally, a few whiffs of ether or chloroform, or orange oil will quiet a patient who is somewhat excited. Many patients were surprised when they were told that the operation had been completed.

The after-condition of the patients usually has been ideal. A majority of them I should say had no discomfort whatever. Usually there was no nausea. Two or three patients complained of headache, but it was never of sufficient intensity or duration to become a serious matter. The postoperative suffering was certainly less than after the use of ether or chloroform; and probably a shade less than after nitrous oxide anesthesia.

Difficulties of Administration.—The technic followed in this series was that elaborated by Babcock. The solution employed consists of stovain (0.08 gm.), to which is added a small amount of lactic acid (0.04 c.c.) for the purpose of holding the drug in suspension in the alkaline spinal fluid, and a little alcohol (0.2 c.c., water, 1.8 c.c.), to make the solution of less specific gravity than that of the spinal fluid which is very constant between 1.00055 and 1.00065. Another solution of a specific gravity, greater than that of the spinal fluid, is composed of stovain (0.08 gm.), lactic acid (0.04 c.c.), milk-sugar (0.10 gm.), water (2 c.c.).

The first and lighter solution rises in the spinal fluid; the second is heavier, and sinks so that extension of the analgesia above the point of injection, or limitation to the areas below, may be secured by selecting the appropriate solution and by elevating the head or the pelvis of the patient.

The spinal cord ends at about the level of the disc, between the first and second lumbar vertebræ; below this is the cauda equina. The second lumbar interspace is a favorite spot for injecting the spinal anesthetic, when a loss of pain sense in the perineum, external genitalia, and lower abdominal wall is desired. If the operation is to invade the upper abdomen, or the incision is to reach as far as the umbilicus, the injection must be made in the first lumbar interspace.

In a majority of the cases herewith reported, the injection was given in the second interspace. The technic is as follows:

The patient is seated upon the side of the operating table with the legs hanging over, the arms are folded over the lower abdomen, the

head is bent forward, and the back arched. The skin surface is disinfected by the application of iodine and alcohol, and the fourth lumbar interspace is located by placing a towel with its edge running across the line of the posterior iliac crests. This marks the fourth lumbar spine or the fourth lumbar interspace. The second or the first lumbar interspace is now located, and the skin is marked at the lower border of the spinous process above it. The patient must be warned not to move after the mark has been made. The needle is then thrust through the skin, about 2 mm. to one side of the median line, and then pushed toward the spinal canal, being held perpendicularly to the surface. The needle is carried forward, until the resistance of the ligamentum subflavum is felt when the mandrin is withdrawn. As soon as the resistance of the ligament is overcome, the needle is pushed outward cautiously, a few millimeters at a time, until the slight resistance of the dura is felt. Often this punctures with a palpable snap. Spinal fluid then drops from the needle. The needle is carefully rotated, to make sure that the beveled point is entirely through the membrane. The syringe filled with the anesthetic solution is attached to the needle, and about 1 c.c. of the spinal fluid is drawn into the syringe. The mixture of spinal fluid and stovain solution is now steadily and rather rapidly injected, the needle is quickly withdrawn, and the patient immediately placed in a recumbent posture, with the head slightly raised. Analgesia is usually complete by the time the operative area is prepared—a period of from three to five minutes.

Intradural injections are not difficult. Except in five or six instances, I have had no difficulty in introducing the needle, the spinal puncture proceeding without any embarrassment, the spinal fluid flowing freely, and everything being entirely satisfactory. In one or two cases it was necessary to withdraw the needle slightly and reintroduce it in a different direction. In one I was obliged to withdraw it entirely and reinsert the needle three or four times. In another, a complete prolapse complicated by circulatory disturbance and general edema, I could not feel the tips of the spinous processes, and in this case I had to insert the needle three times. As one proceeds with the method, he becomes, of course, more skilful in introducing the needle.

It would seem unlikely that in a majority of these cases any traumatism had been done to the cord. Spinal fluid flows out as soon as the needle enters the intradural space, and then, of course, the needle is pushed no further. Moreover, the needle is usually introduced below the end of the cord. It appears to a bystander watching a spinal puncture, unless it proceeds without difficulty,

that traumatism is considerable. He should remember that the trauma affects the tissues outside of the spinal sheath. As soon as the needle enters the spinal canal, fluid escapes.

Nevertheless, it can be seen at once that spinal anesthesia is considerably more troublesome to the operator than general anesthesia. In the case of general anesthesia, the surgeon approaches his patient already anesthetized. It may be urged, however, that this objection may be overcome by having an assistant give the spinal anesthesia and prepare the patient for the surgeon just as in general anesthesia. Nevertheless, inhalation narcosis can be continued with no additional difficulty, whereas a repetition of the spinal injection, or an addition to the dose of stovain after the operation has begun, is impracticable.

In the series I report, the analgesia was perfect in twenty-three; it was good, but required ether or chloroform additionally in six; it was unsatisfactory in seven. The duration of the analgesia varied from twenty-seven minutes to one hour.

When the duration of anesthesia is not sufficient to complete the operation, ether or chloroform may be given. As a rule, only a small quantity is necessary. Thus, in a recent operation, 3 ounces was all that was required in an operation lasting about one and one-half hours. The patient complained of some pain after thirty minutes. There may be some disadvantage if a large dose of morphia and scopolamin has been given previously, on account of its effect upon the pupils. However, a skilful anesthetist will be able to overcome this difficulty. It may be argued, that if it is ever necessary to add ether or chloroform to the spinal anesthesia, the anesthesia has failed in its purpose, *i.e.*, the avoidance of these drugs. Nevertheless, it is true that a small amount of ether may be harmless, when a large amount would prove quite the contrary. It emphasizes what I believe to be true, however, that operations under spinal anesthesia should preferably be those which are not expected to consume more than an hour. Exceptions may be found to this, when the operation is deliberately undertaken with the idea that ether will be needed as an adjuvant, but in which it appears that the spinal anesthesia will be an advantage in lessening the total amount of ether required. This has been demonstrated abroad, particularly in Wertheim operations for cancer of the uterus.

The factors which influence the height of the analgesia, its degree and duration, are:

1. *The Point of Injection.*—If celiotomy is to be done, the injection must be made in the first lumbar interspace. Injections in the second

lumbar interspace occasionally gave satisfactory analgesia as high as the umbilicus, but this was the exception rather than the rule.

2. *Precipitation of the Stovain by Sodium Carbonate.*—The needle and syringe, and the sterile basin containing sterile water which is used for the preliminary testing of the syringe, must not be boiled in the instrument sterilizer, where they may be contaminated with sodium carbonate, which is so frequently used to raise the boiling point and prevent rusting. Sodium carbonate will render the stovain partially or totally inert. It is unadvisable, also, to use alcohol in preparing the syringe; alcohol will lower the specific gravity of the injection fluid, and cause it to rise higher and faster in the spinal canal.

3. *The Free Flow of Spinal Fluid into the Syringe and its Admixture with the Anesthetic Solution.*—If the spinal fluid does not drop freely and uninterruptedly from the needle, the point of the needle is not well placed within the spinal canal, the stovain solution if injected, will not reach the desired location, and analgesia will fail entirely or be incomplete. There may be some exceptions to this statement. Nevertheless, it will be found true, that the spinal fluid flows freely from the end of the needle and into the syringe when attached, pushing back the piston and mixing with the stovain solution, in successful cases.

4. *The Strength of the Solution.*—The dose of the stovain solution is determined by the age and weight of the patient. In the series I report, it varied between 4.5 and 6 cg. The problem of dosage will be more fully discussed later.

The Immediate Dangers.—Every patient in the series remained in good condition throughout the operation, and no stimulation whatever was required except in one instance. That patient had been given morphia, gr. $\frac{3}{4}$, scopolamin, gr. $\frac{3}{100}$, previous to the administration of the spinal anesthetic. After the hysterectomy was completed, she suddenly stopped breathing, and all efforts to resuscitate her were unavailing. There is no doubt, in my mind, that the spinal injection was disastrous only because of the very depressing effect of the huge dose of morphia and scopolamin. The case might very properly be excluded from a series in which a prescribed technic had been followed, but it is included so as to make the report complete, every case in which spinal anesthesia was attempted, whether successful or not, being herewith recorded. Those who have a prejudice against spinal anesthesia, will be inclined to lay this misfortune at its door, but anyone acquainted with the facts would be convinced that the morphia and scopolamin were responsible.

The determination of the dose of stovain is one of the difficult problems connected with spinal anesthesia. Even though the anesthetic solution is compounded after a set formula, its strength varies, either because the chemical composition of the drug itself varies, or because its activity has been modified by sterilization. In a clinic where spinal anesthesia is used constantly, each new lot of anesthetic ampoules must be tested in order to determine the maximum and the minimum dose. The dose of stovain depends upon the age and size of the individual. The ampoules as they are prepared, contain 8 cg. of stovain. The largest amount I have used was 6 cg. Usually it has been 4.5 and 5, or 5.5 cg.

No preliminary morphia and scopolamin is used in the young. In those over thirty, the average dose of morphia is $1/6$ gr., and of scopolamin $1/150$. In some patients this has no appreciable effect, and the dose of one or both drugs, may be repeated. This is determined by the condition of the patient (the pulse, respiratory rate, pupils, etc.), and whether they are drowsy and inclined to sleep, or wide awake and nervous. It is an important part of spinal anesthesia, therefore, to determine just how much morphia, scopolamin, and stovain are needed, because if too little is given, anesthesia will fail, and if too much is given, the patient will be put in great danger.

Emphasis may be laid upon the necessity of immediately lowering the patient from the sitting position as soon as the injection is given. This necessity obtains particularly when a solution is used (as in our series) of lighter specific gravity than the spinal fluid. If, under such circumstances, the patient were allowed to sit up, or if she were allowed to lie down with the shoulders and head higher than the pelvis, the anesthetic solution would rise in the spinal canal and influence the higher nerve roots. Again, as previously urged in cleansing the syringe and the needle, alcohol should not be used. This tends to further diminish the specific gravity of the injection, and may lead to a rapid diffusion upward of the anesthetic solution.

Deaths on the operating table from spinal anesthesia occur more frequently than ether, chloroform, or nitrous oxide. I happen to know of four deaths from spinal anesthesia in Philadelphia, in clinics where it is only exceptionally used. Unquestionably, there have been many others. Not only the record of these accidents, but also the care that must be taken to guard against them, proves what a dangerous method it is, and how constantly they who use it, must be on guard.

Sudden death occurs, also, in the course of general inhalation nar-

cosis, but not as frequently. It is only logical that this difference should exist. If a patient under inhalation anesthesia shows toxic symptoms, the anesthetic can be withdrawn, but if toxic symptoms appear under spinal anesthesia, all we can do is to hope to tide the patient over until the effect of the anesthetic has worn off.

Nevertheless, in contrasting the mortality of spinal anesthesia with that of ether and chloroform, one must not lose sight of the fact that postoperative morbidity, and deaths from pneumonia, kidney failure, etc., are greater after ether or chloroform anesthesia, than after spinal anesthesia. This, of course, is not true of nitrous oxide and oxygen. Postoperative deaths as the result of ether, and postoperative morbidity, is undoubtedly much greater than is generally supposed. Gellhorn, in a recent paper on spinal anesthesia, says: "There are no statistics in existence which give a true picture of the alleged harmlessness of the open ether inhalation narcosis. The exact number of fatalities due to ether, will never be known, nor has the rôle of ether in the causation of postoperative complications which injure life and health of the patients, ever been exhaustively considered. Few men have the courage to publish their failures, and the medical journals, as Sellheim remarks, serve as a medium for recounting accidental success rather than the reverse."

In a large series of cases of spinal anesthesia, the mortality from the anesthetic at the time of operation, has been very small. Sellheim (*Med. Klin.*, 1910, vi), in 1909, reported 1000 major pelvic operations under spinal anesthesia, with but one death and few disturbances, and Kroenig (*Operative Gynäkologie*, Leipzig, 1912), in 1912, recorded 2500 cases with no fatality. Babcock (*N. Y. Med. Jour.*, Nov. 8, 1913) has recently reported a large series of cases, 5000 injections, with ten deaths on the table and one shortly after. These cases included some very bad risks.

The Remote Danger.—The remote danger concerns disturbances of sensation or motion following some time after the induction of spinal anesthesia, and due to trauma inflicted upon the cord. Crile, in an experimental study of the effect of trauma of the cord, found that if aseptic precautions were taken in the spinal puncture and injection, even in those cases in which the cord itself was perforated, careful inspection afterward failed to reveal the point of the injection. The cords were hardened and sectioned throughout the approximate area of injection, and in but few instances was any degeneration, infiltration, or hemorrhage found.

Other authors have given it as their opinion, that the introduction of a fine needle through the cord would not result in any serious

injury. If the technic is carried out properly, the anesthetic solution can never be injected into the substance of the cord, because just before the solution is injected, spinal fluid is flowing into the syringe, and therefore the point of the needle cannot be embedded in the cord.

As to the possibility of late degenerations with motor or sensory paralysis, I cannot, of course, speak from personal observation. Such cases are supposed to have occurred. Nevertheless, I know of no authentic instance. If the injection is made properly, it appears to me almost an impossible consequence, or at least a very improbable one.

In reviewing my cases, I wish to draw attention to the fact that they represent those patients who were in the most unfavorable condition for operation. The age varied between sixteen and seventy-four. The indications for spinal anesthesia in preference to ether and other forms of inhalation anesthesia, were as follows:

Toxemia from intestinal obstruction and pelvic

infection.....	4
Heart disease.....	8
Phthisis.....	8
Chronic bronchitis (tuberculous (?)).....	9
Septic bronchopneumonia	2
Beginning peritonitis.....	1
Kidney disease.....	1
Advanced age, arteriosclerosis, and toxemia.....	2
Hypertrophic cirrhosis of the liver and general edema..	1

The operations performed were as follows:

Supravaginal hysterectomy.....	9
Salpingo-oophorectomy, appendicectomy, and suspension	8
Appendicectomy for acute gangrenous appendicitis.....	1
Anterior vaginal hysterotomy.....	2
Plastic operations.....	7
Vaginal hysterectomy for cancer.....	1
Abdominal hysterectomy for cancer.....	1
Gastroenterostomy, enteroenterostomy, and enter- orrhaphy.....	3
Vaginal incision, pelvic abscess.....	1
Vaginal myomectomy.....	1
Suprapubic cystotomy for stone.....	1
Operations for prolapse of uterus, also cholecystotomy for stone.....	1

		Diagnosis	Complication	Operation	Remarks
(1)					
Patient	E. W.	Lacerated cervix.	Chronic bronchitis.	Trachelorrhaphy.	Good
Age	41.	Complete tear of perineum.		Operation for complete tear.	
Date of op.	12-15-11.	Chronic bronchitis.			
(2)					
Patient	R. H.	Retroflexed uterus.	Pulmonary tuberculosis.	D. & C.	Good.
Age	22.			(Wylie drain).	
Date of op.	12-26-11.			Baldy shortening of round ligaments.	
(3)					
Patient	M. W.	Relaxed perineum.	Mitral regurgitation.	D. & C.	Good.
Age	36.	Hemorrhoids		Posterior colporrhaphy (Hegar).	
Date of op.	1-12-12.	Bilateral adherent appendages; adherent appendix.		Excision of Hemor. Supravag. hysterectomy; bilat. salpingo-oophorectomy; appendicectomy.	
(4)					
Patient	E. L.	Retained secundines.	Bronchitis.	D. & C.	Good.
Age	25.	with infection.		Application of carbolic acid.	
Date of op.	2-9-12.				
(5)					
Patient	M. R.	Cancer of cervix.	Phthisis.	High amputation of cervix, followed by vag. hysterectomy; bilat. salpingo-oophorectomy; drainage.	Good.
Age	37.				
Date of op.	3-2-12.				
(6)					
Patient	B. G.	Cystocele; rectocele.	Chronic bronchitis.	D. & C.	Good.
Age	47.	Partial prolapse.		Ant. coloporrhaphy; posterior colporrhaphy; ventrofixation.	
Date of op.	4-4-12.				
(7)					
Patient	A. S.	Lacerated cervix.	Bronchitis.	D. & C.	Good.
Age	38.			Trachelor.; dilatation of sphincter.	
Date of op.	4-10-12.				
(8)					
Patient	E. L.	Adherent ovaries; bilat. pyosalpinx; adherent appendix.	Chronic bronchitis.	B. & C.	Good.
Age	26.			Carb. ac. to uterus.	A little ether.
Date of op.	5-18-12.			Rt. salpingec; appendicac; left salpingo-oophorectomy; drainage.	(3ii).
(9)					
Patient	J. W.	Cervical fibroid (size of grape fruit).	Myocarditis.	Myomec.; para-vag. incision.	Good.
Age	58.				
Date of op.	6-20-12				

		Diagnosis	Complica- tion	Operation	Remarks
(10)					
Patient	M. T. W.	Pregnancy	Phthisis.	Vag. Cesarean Sec.	Good.
Age	29.	4 mos.		Ant. hysterot. with	
Date of op.	7-3-12.			extraction of	
(11)				fetus.	
Patient	E. R.	Uterine	Nephritis.	Supravag. amputat.	Failed.
Age	35.	fibroid pro-		of uterus with re-	
Date of op.	7-7-12.	ducing pres-		moval of both ad-	
		sure upon		nexa.	
		left ureter,			
		renal colic,			
		& pyuria.			
(12)					
Patient	M. M.	Ectopic	Bronchitis.	Supravag. hysterec.	Fair.
Age	30.	pregnancy.		Rt. salpingo-	Small
Date of op.	7-19-12.	Pelvic		oophorec.	amt. of
		peritonitis.		Conserv. left	ether.
				ovary.	
				(Vaginal drainage.)	
(13)					
Patient	M. McN.	Bilat. pyo-	Toxemia and	Bilat. salpingo-	Failure.
Age	21.	salpinx.	general	oophorectomy;	
Date of op.	7-24-12.	Ovarian	weakness.	drainage.	
		abscess.			
		Intestinal			
		adhesions.			
		Retroperi-			
		toneal ab-			
		scess.			
(14)					
Patient	M. B. C.	Pregnancy	Phthisis.	Ant. vag. hysterot-	Good.
Age	28.	3-4 mos.		omy.	
Date of op.	8-1-12.			Extraction of	
				fetus.	
(15)					
Patient	J. T.	Intestinal	Toxemia.	Enterotomy; entero-	Good.
Age	28.	obstruction;		enterostomy;	
Date of op.	8-20-12.	Strangula-		anastomosis be-	
		tion by ad-		tween cecum and	
		hesion.		small intestine at a	
				point above the	
				obstruction.	
(16)					
Patient	E. S.	Pyloric	Myocardial	Gastroenterostomy.	Good.
Age	53.	obstruction.	disease.		
Date of op.	8-22-12.				
(17)					
Patient	M. T.	Fibroid	Myocarditis.	Hysteromyomec-	Good.
Age	40.	tumor of		tomy; complete	
Date of op.	12-2-12.	uterus; in-		salpingo-oopho-	
		traumural		rectomy.	
		& sub-			
		vesical.			
(18)					
Patient	M. P.	Tubo-	Septic in-	Attempt at vag.	Failure
Age	25.	ovarian	toxication.	puncture (abscess	
Date of op.	12-28-12.	abscess,		too high); left sal-	
		(left); ad-		pingo-oophorec.	
		herent ad-		supravag. hysterec.	
		nexa (rt.).		Injury to rectum;	
				suture; drainage.	
(19)					
Patient	B.	Pelvic	Septic	Vaginal puncture.	Good.
Age	21.	abscess.	pneumonia.		
Date of op.	1-3-13.				

		Diagnosis	Complication	Operation	Remarks
(20)					
Patient	B.	Acute	Septic	Supravag. hysterec.	Failure.
Age	21.	metritis.	pneumonia.	with bilat. salpingo-oophorec.; drainage	
Date of op.	1-10-13.	Bilat. pyosalpinx.			
		Bilat. ovarian abscess.			
		Cellulitis.			
(21)					
Patient	C. L.	Fibromyoma	Anemia;	D. & C.	Good.
Age	41.	of uterus.	myocarditis; chronic	Supravag. hysteromyomec. with bilat. salpingo-oophorec.	
Date of op.	1-13-13.		cough.		
(22)					
Patient	A. E.	Carcinoma	Emphysema.	Panhysterectomy.	Good.
Age	59.	of fundus	Myocarditis.	for cancer.	
Date of op.	1-13-13	uteri.		(J. G. Clark.)	
(23)					
Patient	S.	Acute hem-	Congenital	Appendicectomy;	Good.
Age	16.	orrhagic	heart	drainage.	
Date of op.	1-16-13.	appendicitis (retrocecal).	disease.		
(24)					
Patient	N. T.	Rt. hydro-	Pulmonary	Rt. salpingec-	Failure.
Age	27.	salpinx.	tuberculosis.	tomy.	
Date of op.	1-25-13.	Universal pelvic adhesions.			
(25)					
Patient	L. S.	Intestinal	Toxemia.	Repair of intestinal fistula.	Fair.
Age	30.	fistula.		(J. G. Clark.)	
Date of op.	1-27-13.	Chronic pelvic peritonitis.			
(26)					
Patient	A. A. F.	Fibromyoma	Myocarditis.	Supravag. hysteromyomectomy with bilat. salpingo-oophorectomy; appendicectomy.	Fair.
Age	51.	uteri; bilat. hydrosalpinx; fecal concretion appendix.			Ether and Chloroform.
Date of op.	1-30-13.				
(27)					
Patient	M. F.	Lacerated	Chronic	D. & C.	Good.
Age	39.	cervix;	bronchitis.	Amputation of cervix; anterior colporrhaphy; posterior colporrhaphy (Hegar); left salpingo-oophorectomy; occlusion rt. tube; ventrofixation.	for 55 min., then ether.
Date of op.	1-30-13.	cystocele; rectocele; relaxed perineum; left hydro-salpinx.			
(28)					
Patient	G. B.	Perforation	Shock.	Closure of rent in fundus by sutures; ventrosuspension; drainage; inversion of serosa of small intestine.	Fair, small amt. of ether.
Age	28.	of uterus (rupture); bruising of small intestine.			
Date of op.	3-3-13.				

		Diagnosis	Complications	Operation	Remarks
(29)					
Patient	La D.	Adherent appendix; retroposition of uterus; cystic adherent ovary (left); bisteroptosis.	Phthises	D. & C.; Appendicectomy; left salpingo-oophorectomy; ventrosuspension; excision of varicose veins	Failure.
Age					
Date of op.	4-12-13.				
(30)					
Patient	M. De F.	Vesicovaginal fistula; relaxed perineum; rectocele.		Repair of fistula; posterior colporrhaphy.	Good.
Age	43.				
Date of op.	10-16-13.				
(31)					
Patient	F. N.	Fibroid tumor of the uterus.	Chronic bronchitis.	Supravaginal hysteromyomectomy.	Death.
Age	45.				
Date of op.	10-11-13.				
(32)					
Patient	M. I.	Ischio-rectal abscess; vesicovaginal fistula.	Miliary tuberculosis.	Curettement and packing of incision.	Good.
Age	21.				
Date of op.	11-28-13.				
(33)					
Patient	A. H.	Stone in the bladder; cystitis.		Suprapubic cystotomy. (J. G. Clark.)	Good.
Age	74.				
Date of op.	12-12-13.				
(34)					
Patient	M. C.	Prolapsus uteri.	Bronchitis; hypertrophic cirrhosis of liver.		Good.
Age	67.				
Date of op.	12-31-13.				
(35)					
Patient	M. J.	Prolapsus uteri; gall stones.	Bronchitis.	Amputation of cervix; anterior & posterior colporrhaphy; fixation of uterus; cholecystectomy. (J. G. Clark.)	Good.
Age	52.				
Date of op.	1-16-14.				
(36)					
Patient	A. B.	Cancer right labium majus.	Arteriosclerosis; bronchitis.	Excision of growth by cautery; excision of inguinal glands en bloc. (J. G. Clark.)	Good.
Age	65.				
Date of op.	1-26-14.				

CONCLUSIONS.

1. Spinal anesthesia even in expert hands, will have a higher immediate mortality as a routine anesthetic than ether, chloroform, or nitrous oxide.

2. Spinal anesthesia in expert hands, has no postoperative mortality or morbidity, and in this respect is superior to ether, chloroform, and infiltration anesthesia, but it is not superior in this respect to nitrous oxide and oxygen.

3. Spinal anesthesia is more troublesome to the surgeon than ether, chloroform, or nitrous oxide and oxygen anesthesia.

4. Spinal anesthesia should not be used unless the surgeon has familiarized himself thoroughly with all the details of the technic; he also should be aware, fully, of the complications which may arise, and be ready to meet them at a moment's notice.

5. Spinal anesthesia well given, is the *best* form of anesthesia in *selected* cases.

6. Spinal anesthesia should be reserved for those operations in which the dangers of general anesthesia are increased, or in which nitrous oxide and oxygen and local anesthesia are unsuitable or unsatisfactory.

119 SOUTH TWENTIETH STREET.

THE CLINICAL SIGNIFICANCE OF SARCOMATOUS CHANGE IN UTERINE FIBROMYOMA.*

BY

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Work done under the tenure of a George Blumenthal, Jr., Fellowship.

THE occurrence of sarcoma in fibromyomata† has of late awakened considerable interest because of the enthusiastic reports of foreign investigators who have used Röntgen rays either alone or in combination with radioactive substances in the treatment of uterine fibromyomata. The question arises as to whether the tumors in which malignant changes are present are favorably influenced by such treatment. This question has not been answered and up to the present time no conclusive proof of beneficial results has been brought

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† The terms myoma, fibromyoma and fibroids are used synonymously in this paper.

forward. Numerous authors have minimized the frequency of the occurrence of malignant changes and have maintained that the diagnosis of such changes is a comparatively simple matter.

In the following communication it will be shown that the malignant change takes place rather frequently, and also that the diagnosis of such change is rarely made before, but usually only after, operation.

In a study of 250 cases of uterine and cervical fibromyomata twelve showed sarcomatous changes of various types. In most instances(9) the myomata were multiple with but one focus of sarcomatous change. In but one instance were the sarcomatous areas multiple.

Macroscopically it may be very difficult to distinguish definitely the sarcomatous nodule from the pure fibromyoma. Of course there are tumors that arouse one's suspicions or may even be definitely diagnosed on gross examination. Such tumors present, either wholly or in part, a yellowish-white, homogeneous, gelatinous appearance. These areas may be found in the tumor set off by contrast with the pinkish-white fibrous, whorl-like appearance of the fibromyomatous portions. Occasionally these tumors are soft, brain-like in consistency and show cysts of varying size, containing reddish- or brownish-colored fluid. They occasionally present hemorrhagic zones, or areas of liquefaction and necrosis. Tumors in which hemorrhage and necrosis have taken place have a mottled appearance with wide color variations.

In our series of twelve cases we found two cervical fibromyomata showing sarcomatous change, both being intramural tumors, and in one of them there were additional typical intramural uterine fibromyomata. In the other ten cases, eight of the sarcomata occurred in submucous tumors (seven of the latter cases being multiple myomata), the other two cases being interstitial tumors, both showing multiple myomata.

Microscopically the sarcomata presented either pure spindle cell type (five cases), pure round cell (one case), and combination of both types (four cases). In the latter type there were areas presenting varying numbers of giant cells.

Sarcomata that develop in myomata may arise from various structures comprising the fibroids. They arise from the interstitial tissue of the myoma, the adventitia of the lymph and blood-vessels and also from the ripe muscle cells. The classification and nomenclature of these sarcomata are still undetermined, but most authors agree to call those tumors that arise from the interstitial tissue, or adventitia,

myosarcomata, that is, tumors with two separate components, a myoma and a sarcoma, both growing independently. The sarcomata arising by a transition from normal muscles are called myomata sarcomatodes, that is, myomata that have become sarcomatous.

The clinical histories of the sarcomatous cases taken as a whole show nothing characteristic. The age of the patients varied between thirty-four and sixty-one years, the average being forty-nine years. In only one was a loss of weight noticed. The other symptoms of pain, metrorrhagia, menorrhagia, constipation, frequency of urination, dysuria and edema of the legs, offer no diagnostic criteria. From the physical examination the differential diagnosis is not to be definitely made. In only two cases in our series was the diagnosis made and then only at the time of operation. In one instance a diagnosis of carcinoma had been made and an exploratory curettage revealed sarcoma. The diagnosis from the gross appearance is also fraught with difficulty. One need but mention those cases where only after the appearance of metastases or recurrences a more careful microscopic examination reveals the nature of the neoplasm, as in Cullen's(1) case. Gessner(2) reported thirty cases which were only diagnosed after operation. Winter(3) in eleven cases, made the diagnosis in only one. Warnekros(4) in a recent paper reports seven cases, none of which was diagnosed. Veit(5) states that the clinical diagnosis of malignant change in a myoma is difficult and often impossible.

In our series of cases we found that 4.8 per cent. of the so-called fibroids of the uterus are sarcomatous. Individual statistics vary very markedly, from 10 per cent. recently published by Warnekros based on seventy-eight cases, to 0 per cent. of Essen-Möller(6) based on 105 cases. Discrepancies like the above can be understood when based on comparatively few cases, for, as Miller's(7) statistics show, in his first series of 249 cases, there were no sarcomata found, while in his subsequent sixty-nine cases five sarcomata were diagnosed microscopically.

Taking the collected statistics reported by Miller, we have

	Cases	Sarcoma	Per cent.
Miller.....	9750	192	1.9
Lewis.....	1518	22	1.4
Olshausen.....	6470	77	1.3

It must be remembered, however, that these statistics are based on cases dating back many years when tumors were not so carefully examined, and undoubtedly many sarcomata were overlooked. Again they include postmortem material in which many tumors were accidental discoveries and had not given rise to symptoms. They include periods in which sarcomatous change is practically never found. If the incidence of sarcoma during definite age limits was taken, the proportion would be correspondingly more accurate and higher.

In our series of uterine and cervical fibromyomata 192 occurred in women between the ages of thirty-four and seventy-six. These age limits represent the oldest and youngest patients with sarcoma. Using the figures thus obtained as a basis to compute the relative frequency of sarcomatous change we find that it occurs in 6.25 per cent. of the cases. As can be seen from the ages in our cases the occurrence of sarcoma is most frequent about the time of the menopause. While it is true that a certain number of myomata disappear at the menopause, Müller and Kottman(8) have shown that the menopause does not bring about the disappearance of myomata and in fact 0.9 per cent. of all myomata develop after the menopause. It is just in these cases, that give rise to symptoms about the time of the menopause, that the greatest care must be exercised in the diagnosis and treatment.

Since the perfection of the Röntgen ray treatment of myomata by Krönig and Gauss(9) this method has rapidly grown in popularity, especially abroad. While in simple uncomplicated myomatous cases it is undoubtedly a most efficient procedure, yet one must proceed carefully if he would take into consideration the possibility of wasting valuable time in useless treatment. To a great extent the Röntgen ray treatment is most applicable in those cases where the frequency of sarcomatous change is highest, namely, between the ages of thirty-eight and fifty years, and also to that type of tumor where the malignant change is relatively common, that is, the intramural type. A factor of great importance that may cause delay in the carrying out of a proper procedure is the temporary cessation of the one important symptom, namely, the hemorrhage, while the tumor remains uninfluenced in character. It may diminish in size as has been reported by Krönig. We know from experimental evidence that the rays affect the follicle apparatus of the ovary and in this manner may bring about the beneficent results both as far as the hemorrhage and the diminution in the size of the tumor are concerned. The sarcomatous elements may not be giving rise to any special symptoms and we thus

are lulled into a feeling of false security. Krönig and Gauss suggest that the Röntgen ray may have a curative effect on any sarcoma that may be growing but until this is proven it is not fair to expose the patient to the unnecessary risk and delay. In other words, the Röntgen ray treatment for fibromyomata, in women about the menopause, is attended with the risk of overlooking a sarcoma; first, because of the comparative frequency of the complication at that age, and secondly, because of the lack of characteristic symptoms and the difficulty of diagnosis. The use of mesothorium and radium in these cases, either alone or as an adjunct to the Röntgen ray, is open to the same objection.

The proper procedure in these cases is undoubtedly operative, and the choice of operation should be a panhysterectomy. The older tendency to do a supravaginal amputation is undoubtedly the cause of the relatively frequent recurrences.

In one case, not included in these records, a supravaginal amputation, in a case diagnosed multiple fibroids, was done. On microscopic examination one of the small tumors situated in the cervix proved to be a spindle cell sarcoma. The uterus had been amputated about 1.5 millimeters below this tumor, and microscopically this piece of cervical tissue was free from involvement. The area of safety was very small and a complete removal was indicated, but the surgeon did not feel that he could expose the patient to the second operation necessary to remove the cervix. Ten months after operation the cervical stump was atrophied, freely movable, and showed no evidence of malignant change. The case is too recent to give any further report but a primary complete hysterectomy would have obviated, or at least, mitigated considerably any subsequent anxiety.

Hansen(10) reports two cases where after supravaginal amputation for fibroids there was a recurrence in the cervical stump, in one case five months later, in the second fourteen months later. He, too, urges the advantage of a panhysterectomy.

That recurrences have resulted even when a panhysterectomy had been done is also well known. Bumm (quoted by Warnekros) in four cases out of 200 where he had done a panhysterectomy, had a recurrence in three cases in one year, and in the fourth in four years. It would seem advisable in those cases of fibromyoma occurring about the time of the menopause to have the services of a competent pathologist who can, if necessary, make a frozen section at the time of the operation and should the tumor be diagnosed sarcoma or even be suspicious, in addition to the panhysterectomy a dissec-

tion of the parametria similar to, though not necessarily as extensive as that practised for carcinoma, should be done. The glands are not involved in these cases and need not be removed.

Under no circumstances should a woman at the menopause with fibromyoma of the uterus be subjected to any operative procedure less than a panhysterectomy if anything more than a palliative treatment is being undertaken.

The following are notes on the clinical and pathological data of our twelve cases.

CASE I.—Mrs. L. Z. (Acc. No. 10739). A patient of Dr. S. M. Brickner, was admitted to the hospital May 7, 1907, discharged May 31, 1907. Aged forty years. Menstruation normal. Last period two weeks before admission to the hospital. Married nineteen years; five children, the last, one year ago. For a number of months has had pain in the abdomen and thighs occurring in attacks. Frequent urination.

Physical Examination.—Uterus retroverted. Rounded mass occupying the anterior wall and fundus. On the right side is a softer mass probably intraligamentous.

Diagnosis was made during operation, probably sarcoma.

Operation.—Supravaginal hysterectomy.

October 30, 1908, pelvis filled with tumor mass. Patient bleeding. May 24, 1909, patient died.

Macroscopical Description.—The uterus was enlarged to the size of a four month's pregnancy due to the presence of an interstitial tumor the size of a large grape fruit. The tumor presents a peripheral, glistening, striated zone resembling myoma tissue, while the center of the mass is soft and necrotic. In the left broad ligament there is another round tumor the size of a lemon which is firm and smooth and on section has a striated whorl-like appearance especially at the periphery. The center of the tumor presents a more homogeneous, yellowish-white smooth surface.

Histological Description.—The central portions of the tumors are composed of closely crowded masses of short spindle cells which have a tendency to arrange themselves around the blood-vessels, and present many mitotic figures. The myoma tissue about the periphery of the tumor is well preserved. The main mass of the fibromyoma has been replaced by sarcoma tissue but there has been no invasion of the uterine wall.

Diagnosis.—Myosarcoma.

CASE II.—Mrs. S. H. (Acc. No. 10233). Admitted to Dr. Krug's service at the Mount Sinai Hospital May 14, 1907. Died May 21, 1907. Menstruation normal. Last period one week before admission to the hospital. Married eighteen years; four children; no miscarriages; last child twelve years ago. Abdomen, which has been large for a number of years, has in the past year gradually been increasing in size. There has been some dragging pain in the back and legs.

Physical Examination.—Abdomen is very much enlarged, bulging and tense. A large, irregular tumor mass felt extending from the pelvis half way between umbilicus and ribs in the midline. The tumor is fixed. Vaginal examination shows a tumor filling the pelvis.

Diagnosis.—Fibromyomata.

Operation.—Panhysterectomy.

Macroscopical Description.—The uterus was enormously enlarged by the presence of a number of tumor masses so as to measure $18 \times 32 \times 12.5$ cm. Hanging from the fundus on the right side there is a pedunculated ovoid mass measuring $12 \times 5 \times 6.5$ cm. This on section presents a smaller cystic portion and a larger solid mass. The solid portion is soft, edematous and presents various colors. The tumor is traversed by numerous whitish bands. On the left there are a number of protuberances varying in size from a plum to a peach, which on section are soft and white with small bands of pinkish-white tissue. In the anterior wall is a pear size nodule with the typical markings of a fibromyoma.

Histological description shows that the greatest mass of the tumors is composed of spindle cells arranged in strands, similar to that of the muscle bundles in myoma. The cells and nuclei show wide variations in shape, size and staining reaction. Throughout the tumor mitotic figures are frequent. Many of the whitish and pinkish bands described are seen to be composed of normal myoma tissue which is interpreted as the remains of an original fibromyoma. There are many areas of necrosis.

Diagnosis.—Sarcoma, whether myosarcoma or myoma sarcomatodes, is difficult to ascertain.

CASE III.—Mrs. R. R. (Acc. No. 10525). Admitted to Dr. Krug's service at the Mount Sinai Hospital June 28, 1907. Aged forty-eight years. Past history negative. Menstruation normal. Last period four years ago. Married twenty-five years; had four children; one miscarriage twenty years ago. Has had sticking pain in left lower abdomen and back for past few months. Has obstinate constipation and frequent urination.

Physical Examination.—Uterus enlarged, studded with small nodular tumors. One just to the right of the uterus is hard.

Operation.—Panhysterectomy for fibromyoma. After operation specimen sent to the laboratory with diagnosis of possible malignant degeneration.

Macroscopical Description.—Specimen consists of uterus and adnexa. The uterus is enlarged, measuring $13.5 \times 10.5 \times 9.5$ cm. It contains several small interstitial tumors about 1.5 cm. in diameter and presenting typical markings of fibromyoma. The uterine cavity is slightly enlarged and projecting into it is an irregularly nodular tumor measuring 4 cm. in diameter. The tumor is firm and elastic and its cut section presents a whitish, smooth cellular appearance.

Microscopical Description.—The small intramural tumors are typical myomata. The large submucous tumor consists of closely packed spindle cells which invade the muscle at the base of the tumor. Here and there in the tumor proper are found remains of muscle bundles which are intact.

Diagnosis.—Myosarcoma.

CASE IV.—Mrs. F. B. (Acc. No. 10898). Admitted to Dr. Krug's service at the Mount Sinai Hospital, August 17, 1907. Discharged September 4, 1907. Aged fifty years. Menstruation normal until three months ago. Has had bloody discharge for three or four months. Married twenty-one years; six children; last fourteen years ago. One miscarriage eight years ago after which she was curetted.

Present Illness.—Pain in the back for past two weeks. No increase in the amount of discharge. Obstinate constipation; has frequent urination.

Physical Examination.—Projecting from the cervix is a tumor the size of a hen's egg. The surface is ulcerated. The uterus feels slightly enlarged. The adnexa are normal.

Diagnosis.—Polyp and fibromyoma.

Operation.—Vaginal hysterectomy.

Macroscopical Description.—The specimen consists of uterus and adnexa. The uterus is slightly enlarged, 12×9×6.5 cm. In the uterine wall there are three nodules about the size of a plum. They present typical markings of a fibromyoma. Projecting into the uterine cavity, from a point 2 cm. below the orifice of the right Fallopian tube, there is a pedunculated, walnut-sized tumor. Its surface is hemorrhagic and covered in part by thickened mucosa. On section it shows a variegated surface consisting of soft yellowish and gray-white areas, hard, whitish, fibrous nodules and larger and smaller hemorrhagic zones.

Histological Description.—The tumor is composed of round and spindle cells which invade the muscle wall. The overlying mucosa is intact. The dense nodules in the pedunculated tumor consist of well-preserved muscle and fibrous tissue arranged in bands. The intramural tumors are typical fibromyomata.

Diagnosis.—Myosarcoma.

CASE V.—Mrs. A. H. (Acc. No. 15230). Admitted to the service of Dr. Lilienthal at the Mount Sinai Hospital November 13, 1908, discharged December 3, 1908. Readmitted February 20, 1909, discharged March 16, 1909. Aged forty-one years. Menstruation normal until a few months ago. Married twenty years, five children. Last child three and a half years ago. Two miscarriages, the last two years ago. For the past few years has had some edema of the feet, a chronic cough, some palpitation and dyspnea. For the past few months has been menstruating every two weeks, ten to eleven days. Periods very profuse accompanied by some cramps. No loss of weight; no enlargement of the abdomen.

Physical Examination.—Signs of chronic bronchitis and nephritis. Uterus small, retroflexed, cavity large. A submucous tumor felt and diagnosed as fibromyoma.

November 15, curetted as palliative procedure as patient's condition did not warrant more extensive operative measures. Nothing abnormal was found in the endometrium.

Patient returned in three months because of persistence of symp-

toms. Physical condition the same. February 23, 1909, vaginal panhysterectomy.

Macroscopical Description.—The specimen consists of uterus and adnexa. The uterus is somewhat irregular and slightly enlarged, measuring $9.5 \times 6.5 \times 6$ cm. There is a small rounded tumor measuring 2.5 cm. in diameter, attached by a broad base to the posterior fundal wall, and covered by intact mucosa. Its surface is smooth and on section it is seen to be composed of many small nodules. Some of these individual nodules, especially near the periphery, have the striated appearance of fibromyomata, while those nearer the center have a smoother, white surface. Surrounding each of the small individual nodules there is a limiting capsule of striated tissue which interlaces and merges into that which envelops the entire tumor.

Histological Description.—Sections through the tumor show, with the low power, that the mass is composed of many smaller ones. The centers of these small tumors consist of sarcoma cells. There are large spindle cells some of which measure five or six times the size of a normal muscle cell. At the periphery of the smaller tumors, and also running through the centers, are streaks of muscle tissue which are undergoing a transition from the normal muscle cells to sarcoma.

Diagnosis.—Myoma sarcomatodes.

CASE VI.—Miss H. L. (Acc. No. 15639). Admitted to the service of Dr. Brettauer at the Mount Sinai Hospital April 10, 1909. Discharged April 26, 1909. Aged fifty-three years. Single. Menstruation normal until two years ago. For the past two years marked metrorrhagia and menorrhagia which has been gradually growing worse. For the past four months severe abdominal cramps constantly present. Pain frequently radiates into the thighs and back. Marked frequency of urination in past four months. Never noticed an abdominal tumor.

Physical Examination.—Marked anemia. Nodular, nontender abdominal mass reaching half way up to the umbilicus. Mass is movable, connected with the uterus. Cervix firm, admits finger. Pelvis filled by a large nodular mass.

Diagnosis after operation: Fibroid with malignant degeneration.

Macroscopical Description.—Specimen consists of uterus and adnexa. Uterus is very much enlarged measuring $15 \times 12.5 \times 8.5$ cm. The enlargement is due to the presence of a globular tumor measuring 8 cm. in diameter, situated in the uterine wall. On section the tumor presents many areas of degeneration with variegated colors. There is a thick capsule of striated tissue. Near the fundus of the uterus there is a small area measuring 1 cm. in diameter where the tissue is soft and white. There are several small intramural fibroids.

Histological Description.—The tumor presents large areas of necrosis and hyaline change, and other very cellular portions. In these latter areas the components are round and spindle cells with many giant cells. The capsule is composed of fibromuscular tissue not invaded by tumor tissue.

CASE VII.—Mrs. B. T. (Acc. No. 11858). Admitted to the service of Dr. Krug at the Mount Sinai Hospital, July 23, 1910. Died August 13, 1910. Aged sixty-one years. Married. Had always been well. Menstruation had always been regular. Menopause twenty years ago. For past eleven months has had a foul, bloody vaginal discharge. No pain. No constitutional symptoms. Abdomen slightly swollen.

Physical Examination.—Uterus enlarged to size of a three months' pregnancy. Cervix normal.

Diagnosis.—Carcinoma. Curettage showed sarcoma tissue.

Operation.—Panhysterectomy.

Macroscopical Description.—Specimen consists of uterus and adnexa. Uterus 11 cm. long. In the region of the isthmus is a small tumor 3 cm. in diameter with the gross appearance of a fibromyoma. At the fundus is a similar tumor, stony hard and situated in the uterine wall. Attached to the uterine wall near the isthmus is a tumor mass 6 cm. in diameter, soft and friable. On section it presents a whitish, smooth, cellular appearance. This tumor invades the cavity of the uterus.

Histological Description.—The soft tumor is composed of closely packed round, spindle and giant cells. There are other areas with marked edema and necrosis and scattered tumor cells. The other intramural tumor is a pure fibromyoma.

Diagnosis.—Mixed cell sarcoma, origin doubtful.

CASE VIII.—Mrs. C. F. (Acc. No. 22969). Admitted to the service of Dr. Krug at the Mount Sinai Hospital, December 17, 1911. History not obtainable.

Macroscopical Description.—Specimen consists of uterus and adnexa. Uterus enlarged measuring $9.5 \times 8.5 \times 6$ cm. The enlargement is due to several small intramural tumors varying in size from a pea to a cherry. There is one nodule the size of a plum. One of the small tumors presents a greenish-brown appearance and is soft in consistency. The other tumors on section present the typical markings of a fibromyoma.

Histological Description.—The sections from the brownish nodule show masses of spindle cells closely packed, present marked irregularity in their nuclei and many mitotic figures. Here and there some strands of normal myomatous tissue are seen. The other nodules are fibromyomata.

Diagnosis.—Myosarcoma.

CASE IX.—Mrs. L. R. (Acc. No. 24209). Admitted to the service of Dr. Krug at the Mount Sinai Hospital, May 29, 1912. Discharged June 14, 1912. Aged thirty-nine years. Menstruation normal. Last period three and a half weeks ago. Married eleven years. Three children; the last three and a half years ago. One miscarriage one year ago. For past six months has had dysmenorrhea which is gradually getting worse. Profuse leukorrhea.

Physical Examination.—Uterus enlarged, studded with small fibroids.

Macroscopical Description.—Specimen consists of uterus and ad-

nexa. It is symmetrically enlarged, measuring $14 \times 10 \times 8.5$ cm. There are three small nodules ranging from a pea to a bean in size. Occupying the entire, much dilated, cavity of the uterus, is a large tumor measuring 6 cm. \times 4 cm. It is attached by a broad base to the entire posterior wall, but its base is not distinguishable from the uterine wall. The lower pole of the tumor is hemorrhagic and covered by thin mucosa. On section the tumor presents two distinctly different areas. The lower is encapsulated, firm, with the typical markings of a fibromyoma; the upper portion is soft, spongy, white and gelatinous with no capsule. The small nodes in the wall are grossly typical fibromyomata.

Histological Description.—The spongy mass consists of closely packed, irregular spindle cells showing many mitotic figures. The connective tissue is edematous and presents a hyaline degeneration. In the firmer portion of the tumor a similar condition exists, but the cells are less crowded, the hyaline degeneration not so marked and in addition bundles of intact myomatous tissue are present. The tumor is separated from the uterine wall by compressed but normal muscle tissue.

Diagnosis.—Myosarcoma. May be a myoma sarcomatodes.

CASE X.—Mrs. B. G. (Acc. No. 25818). Admitted to the service of Dr. Krug at the Mount Sinai Hospital, January 12, 1913; discharged February 4, 1913. Aged forty-seven years. Previous menstrual history negative. Climacteric five months ago. Profuse vaginal hemorrhage one week ago since which time she has been bleeding moderately.

Physical Examination.—Cervix is large and presents a round tumor the size of a billiard ball. Uterus enlarged and movable.

Diagnosis.—Cervical fibroid.

Operation.—Vaginal hysterectomy.

Macroscopical Description.—The specimen consists of uterus and adnexa. The uterus is slightly irregular at the fundus and enlarged, measuring $12 \times 7.5 \times 5.5$ cm. The fundus presents two small tumors, resembling fibromyomata. Situated on the left side of the posterior lip of the cervix is a round, firm, elastic tumor measuring 5.8 cm. in diameter. It seems well encapsulated and presents the markings of a myoma. In some areas scattered irregularly through the tumor the cut surface is smooth and glistening.

Histological Description.—The main mass of the tumor is composed of spindle cells which vary in size from that of a normal muscle cell to cells four times as large. Scattered in these areas are found a few multinuclear giant cells. In many places, especially near the periphery of the tumor, bands of muscle cells which are present can be demonstrated as undergoing a transition into sarcoma cells.

CASE XI.—Mrs. E. M. (Acc. No. 26643). Admitted to the service of Dr. Brettauer at the Mount Sinai Hospital, April, 1913. Aged thirty-four years. Past history negative. Menstruation normal. Last period three weeks ago. Very profuse. Married nine years; one child four years old; five miscarriages, last four months ago. Since curettage four months ago, patient has been bleeding almost constantly. No pain. Moderate vaginal discharge.

Physical Examination.—Cervix slightly open, uterus enlarged to size of three month's pregnancy.

Macroscopical Description.—Specimen consists of uterus and adnexa. The uterus is enlarged, measuring $12 \times 8.5 \times 7$ cm. Occupying the site of the cervix is a large submucous tumor measuring 6 cm. in diameter, which projects into the cervical canal, distorting it. The tumor is elastic and firm and on section presents a white, glistening, whorl-like appearance and can easily be stripped from the overlying atrophic mucosa. Near the center the tumor has small areas of a more yellowish-white homogeneous appearance. The adnexa are normal.

Histological Description.—The tumor, the most part, is composed of typical fibromyoma. Near the center of the tumor and scattered irregularly at the periphery are areas of closely connected spindle cells with large and small nuclei. Occasional mitotic figures are seen.

Diagnosis.—Myosarcoma.

CASE XII.—Mrs. D. P. (Acc. No. 24102). Admitted to the service of Dr. Krug at the Mount Sinai Hospital, May 13, 1912; discharged May 28, 1912. Aged forty-eight years. Married twenty-nine years, four children, one miscarriage. Menstruation began at thirteen, profuse, lasting ten to fourteen days. Previously well. One year menorrhagia; pain in the left iliac region; frequency of urination.

Physical Examination.—Uterus enlarged and nodular. Right ovary enlarged.

Operation.—Panhysterectomy.

Macroscopical Description.—Specimen consists of uterus and adnexa. The uterus is enlarged, walls thickened. There is a submucous tumor about the size of an orange attached to the fundal wall. On section it presents a white, glistening, whorl-like appearance; interspersed throughout are small hemorrhages and dilated vessels. The cervix presents no abnormalities. There are several small intramural fibroids. Tubes normal, right ovary consists of a small simple cyst.

Microscopical Description.—The submucous tumor presents closely packed masses of irregular-sized spindle cells with rich chromatin content. Scattered throughout the section are small strands of apparently normal muscle bundles.

Diagnosis.—Myosarcoma.

Readmitted October 18, 1913, complaining of abdominal tumor.

Physical Examination.—There is a large abdominal mass extending from the pelvis half way to the umbilicus. This mass is nodular.

Operation.—Extirpation of tumor.

Microscopical examination of the recurrence shows sarcoma.

From a consideration of these cases we see how difficult it is to make a diagnosis of sarcomatous change in myoma from either the clinical course or the gross appearance, and in view of the fact it would seem advisable not to lose valuable time by doing anything for the patient, who is liable to harbor this condition, other than what would be a curative procedure.

SUMMARY.

1. Sarcomatous change in uterine fibromyomata is a comparatively frequent occurrence.
2. Its occurrence is most common about the time of the menopause.
3. The diagnosis of sarcomatous change is difficult.
4. X-ray treatment at the menopause is hazardous.
5. The proper method of treatment is panhysterectomy.

LITERATURE.

1. Kelly and Cullen. Myomata of the Uterus, 1909, p. 190.
 2. Gessner (quoted by Kubinyi). *Arch. f. Gynäk. u. Geburtsh.*, vol. xcvii, p. 237.
 3. Winter (quoted by Kubinyi). *Arch. f. Gynäk. u. Geburtsh.*, vol. xcvii, p. 237.
 4. Warnekros. *Arch. f. Gynäk. u. Geburtsh.*, vol. xcvii, p. 292.
 5. Veit. *Hanb. d. Gynäk.*, 1899.
 6. Essen-Moller (quoted by Miller). *Surg., Gyn. and Obst.* March, 1913.
 7. Miller. *Surg., Gyn. and Obst.*, March, 1913.
 8. Müller and Kottmann (quoted by Ogorek). *Arch. f. Gynäk.*, vol. xcix, p. 190.
 9. Krönig and Gauss. *Münch. med. Wochenschr.*, 1912, p. 762.
 10. Hansen. *Cent. f. Gynäk.*, 1913, No. 17.
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THE TREATMENT OF NECROSIS OF UTERINE FIBROMA.*

BY

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FROM time to time in the history of medicine and surgery, plans of treatment for fibromata have been proffered which would evade operative removal. Ergot and other drugs, electricity in various forms, have come forward, risen into brief prominence and fallen into the limbo of ancient history, because found wanting. The latest claimant for experimental attention is the x-ray, which also, for most cases, will in time be laid aside like the others. As has been well and often shown, it is usually not the fibroma *per se*, which gives the morbidity, but its complications. Even if hemorrhage were held in subjection there would remain acute and chronic peritonitis, salpingitis, oophoritis, intestinal obstruction, ureteral pressure and obstruction, kidney and bladder diseases and obstruction, cardiac muscle degeneration, and last of all the degenerations of the tumor itself. Sarcoma

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needs only to be mentioned to be dreaded; calcification, cystic degeneration, myxomatous degeneration, inflammation, amyloid degeneration, are among the well-known changes which occur.

While upon these and other complications, the *x*-ray can have little if any effect in prevention or cure, it cannot be charged with being their cause.

Not so with the subject of present consideration, necrosis. The *x*-ray, badly applied, and who shall say until afterward that it is being badly applied, may cause vascular and cell changes resulting in tissue necrosis in these tumors, some of which are of low vitality.

As long as the fibroma remains in the body, whether treated or not, it is subject to necrotic change, which has been reported as late as at the age of seventy years. Should pregnancy occur, the tumor becomes a menace to its host. Stavely (*Johns Hopkins Bulletin*, March, 1894, page 33) collected 597 cases which were allowed to go untreated until labor came on. Of these, 37 per cent. died.

The danger arises, *first*, from interference with the proper emptying of the contorted uterine canal, after miscarriage, if this should occur (12 per cent. of deaths in 307 cases). *Second*, many patients have lost their lives from obstruction to labor. *Third*, after delivery necrosis of the fibroma is a dreaded and not uncommon complication of the puerperium, with a high mortality.

In early pregnancy or before delivery sloughing seldom occurs, because of increased blood supply. Rapid growth is more common.

After delivery, if that shall have been accomplished, necrosis must be looked upon as a serious danger, because of the bruising of this large mass of tissue of low vitality; because of the contortion of the uterine canal and subsequent impairment of drainage; and because in the rapid process of involution, the accustomed blood supply of the tumor may be too greatly diminished. Thrombosis may occur and infective organisms reach the tumor from neighboring or perhaps adherent intestine, or from the vagina. If maceration follows, the softened tissue becomes infiltrated with blood, and finally assumes a greenish-brown color. Odor is well marked in submucous growths.

When symptoms of any form of infection arise in the puerperal fibroid uterus, much anxiety should be aroused, as the exclusion of involvement of the fibroid is difficult, and unless early operation be done, the patient will probably be lost. In necrosis following delivery the submucous variety of tumor will rarely be encountered. Such a tumor within the uterine cavity would probably have prevented conception in the first place. Enucleation by the vagina is therefore rarely possible without hysterectomy in the puerperal

state and would probably be followed by increased sepsis if accomplished.

The removal of the uterus, leaving the ovaries, is the operation of choice in the infected puerperal fibroid; and it may be done either by the vagina or suprapubically, according to the preference of the operator, though the vaginal route is most suitable for the small tumors, and is less likely to contaminate the general peritoneal cavity.

In the nonpuerperal state, the occurrence of necrosis is most common in the submucous variety, which may remain wholly within the uterus or be extruded as a polyp from the cervix or vagina. Even in the case of growths reaching to the umbilicus, if it be reasonably certain that the tumor is submucous, it is better if possible to enucleate by morcellation through the vagina, assuming a slight risk of perforation at some part of the uterine wall. It is astonishing how much can be accomplished by patient and careful work of this type with very little risk. The actual cautery may be used for supplementary sterilization.

No man who has once seen the rapid and satisfactory recovery of such patients after vaginal operation, will want to attack them any other way. It is far safer than the abdominal total hysterectomy, as it is practically impossible to avoid risks of contamination in handling the sloughing mass from above.

The necrosis of the subperitoneal tumor is harder to recognize as foul discharge may be absent. The growth will be tender at first, and cachexia well marked. The patient should come to suprapubic abdominal operation before gangrenous conditions have developed. The mortality is however high.

In one of my cases which recovered after suprapubic hysterectomy, a curious necrotic change occurred in the lower end of the abdominal incision. The tissue turned black gray and failed to unite for about an inch without the discharge of ordinary pus. It looked like a local cadaveric poisoning of the wound by contact with fluid from the dead tumor during removal.

The following case illustrates the suprapubic operation.

Mrs. D., aged forty-two, one child, had a degenerating intraligamentary uterine fibroma, reaching into the epigastrium. While there had been moderate pain for several months, the acute condition had lasted only a week. There was intense throbbing pain in the growth, great prostration, slight cyanosis, temperature 100.

Abdominal hysterectomy was done, a quantity of salt solution

being left within the peritoneal cavity. While the condition of the patient was serious at first, she recovered fully and remained well.

Pathological Report.—Acute necrosis.

Three more or less typical cases of vaginal removal of sloughing tumors may be cited as presenting interesting features.

In one the tumor was partly delivered with partial inversion of the uterus.

Mrs. H., thirty-five years, married, births four, miscarriages none. Menses normal until eight months ago, when profuse flow began, lasting two weeks, and since then there has been almost constant bleeding, only five or six days intervening without flow in each month. About the time of the appearance of bleeding, a tumor was noted above the pubis, but this has lately disappeared.

A vaginal protrusion occurred a week ago, which was reduced by her physician and has not reappeared outside since. There is marked odor of decomposition present, with rapid pulse and some fever.

Examination.—From within the cervix springs a thick firm stem, which enlarges into a tumor filling the vagina. Lower down the tumor splits into three main rounded sections. Surfaces bleed easily and are covered with a greenish-yellow, offensive discharge. The cervix presents great hypertrophy with rounded edges having well preserved outline. No infiltration demonstrated. The uterus is partly inverted and shortened.

Operation.—Cautery to pedicle which was about an inch through, well within the uterine cavity. Firm gauze intrauterine packing. No further hemorrhage.

Pathological Report.—Red necrosis of fibroma of the uterus. No malignancy.

The septic condition present on admission disappeared and the patient was discharged well, although the cervix remained 2 inches in diameter. A marked symptom was the rapidity of the pulse, 124 to 132 prior to operation, and continuing 112 after all other symptoms had disappeared. This probably was dependent upon the myocarditis which so often accompanies fibroma of the uterus, with prolonged hemorrhage.

The hypertrophied open cervix, the very short uterine canal, widely open at the bottom and partly everted by the tumor traction, the depression and flattening of the small fundus felt above, and quite in harmony with the statement that a mass was formerly felt above but not now; that the tumor, formerly not in the way had recently been partly extruded from the vagina. No doubt the uterus had been working to deliver the mass for a long time and had recently accomplished it, almost inverting itself at the same time.

Comment.—To the eye and touch this greatly resembled a pedunculated epithelial growth such as is occasionally seen sprouting like a large fissured toadstool, from the cervix. The great hypertrophy of the cervix and the possibility of malignancy, suggest hysterectomy as the wisest treatment. But the attempt to do either vaginal or abdominal hysterectomy in the presence of such a foul mass would

only have invited disaster. Whether malignant or not, the proper treatment in the presence of necrosis is vaginal removal by the cautery or by morcellation followed by the cautery, avoiding tenacula in surrounding tissue.

After the site of the tumor has healed, hysterectomy may be performed by any method selected. The drainage of serum and the cicatrization following, will markedly reduce the size of the uterus, so that the operation will be easier and safer.

In another type the tumor is wholly within the uterine cavity.

Mrs. M., aged fifty years, five children, the youngest eight years old. No miscarriages. Menstrual history negative until two years before, when owing to the approaching menopause, some periods were missed, and once the flow was absent six months.

Again note the bearing of this history upon the erroneous theory sometimes advanced, that fibromas become harmless at or about the menopause. Though previously normal in every way, after the six months' cessation she bled far more freely. There was for several months' watery, foul, ill smelling discharge. Then bleeding with clots. Then severe pain, great hemorrhage and complete prostration while on a journey. The uterus proved to be symmetrical, about the size of a six months' pregnancy. The cervix felt normal and was dilatable. As the contents of the uterus were evidently necrotic, abdominal section was considered dangerous. Vaginal removal of the tumor from inside the uterus was accomplished by dilating the canal and morcellating the large mass inside. It proved to be a necrotic fibroma. Gauze packing controlled the rather copious oozing, but the patient recovered nicely and was known to be well several years later.

In still another type, an actual labor like delivery occurs.

Mrs. R. S., aged fifty-nine, four children, youngest twenty years old. Menstruation normal until five years ago, when an attempt at menopause occurred, with cessation for ten months. Then irregular bleeding began and has continued ever since. For the past two years in much distress because of a hard body pressing into the lower vagina and interfering with sitting and walking. Wore a napkin constantly because of incontinence of urine.

Three hours before being brought to the hospital, there had been much pressing and desire to urinate. While at the toilet a body 4 inches in diameter and 5 inches long had been partly delivered from the vagina, followed by a very severe hemorrhage with prostration and sweating. The tumor projected between the thighs; part of it was reddish black in color, evidently undergoing necrosis.

The leukocytes were 18,950, the patient pale, the pulse compressible. The tumor hung from the cervical canal by a short rigid pedicle an inch and a half in diameter. The cervix had rounded smooth edges, its diameter being about 3 inches.

Operation.—Vaginal removal by compressing the pedicle with

hysterectomy clamps and severing the stump with the cautery. Iodoform gauze pack. There was no further bleeding. The temperature reached 102.6 on the third day, but convalescence was soon established. The bladder control was regained.

Pathological Report.—Myoma, calcareous degeneration. Hemorrhagic necrosis.

Special attention is once more called to the late onset of symptoms. Pathological bleeding for five years, beginning at the age of fifty-four, necrosis and severe hemorrhage at the age of fifty-nine.

Summary.—The best treatment of necrotic fibroma is preventive. That is, the removal of all large or growing tumors, or those which cause symptoms, before they become necrotic. The x-ray is a temporizing expedient which will result in many deaths, either from overlooked malignancy, or from late complications.

Whenever possible the tumors should be removed by the vagina, leaving the uterus if possible, and leaving the ovaries if hysterectomy is done. The actual cautery is a valuable help in the vaginal cases for after-treatment of the tumor site.

The mortality will depend on the degree of infection present when the operation is performed, and should be lowest in those treated by the vagina. That the cases here recorded recovered, is due to fortunate conditions, as the average reported mortality is high.

1831 CHESTNUT STREET.

THE PREVALENCE OF PUERPERAL SEPSIS IN GYNECOLOGICAL WARDS OF PHILADELPHIA HOSPITALS.

BY

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THE existence of puerperal infection has been recognized from the earliest historic period. Hypocrites (460 to 377 B. C.) gives a clear description of the disease which he regarded as being due to the suppression of lochial discharges. This affection was also described by Celsus, Galen and at a later period by Adicena.

Mercatus in 1570 was apparently the first to mention putridity of the lochia which he regarded as an essential feature of the disease. He attributed the putridity and fever to an inflammation of the womb following labor. Ambrose Parè (1575) believed the affection to be due to the entrance of cold air into the uterine cavity.

The first writer who refused to accept the theory of the retention of lochia or entrance of cold air as the cause of fever was Plater who wrote in the latter part of the sixteenth century. He showed that the

disease was due to inflammation of the uterus, which, in his opinion, was caused by the pain and effort involved in delivery. The view that lochial suppression was an essential factor in the disease was still, however, widely maintained and is supported by Mauriceau (1668), Willis (1676), and Sydenham (1682).

The theory of milk matass as a cause of puerperal fever was elaborated by Pusos (1686). He believed that milk circulating in the blood was attracted to the uterus during pregnancy and to the breasts after delivery, but that milkmatases might form in other parts of the body and produce symptoms of malignant fever. This view was finally discredited by Bichat in 1801.

Toward the end of the eighteenth century it became generally recognized that peritonitis was an essential feature of puerperal fever, and that this was associated with putridity of uterine contact. This opinion was maintained by Denman (1768), Smellie (1762), William Hunter (1776), Kirkland (1774) and others, but the opinions held as to the exact cause were still fanciful and vague and referred mainly to miasmatic, climatic or emotional conditions. The contagious nature of the disease was first suspected as the result of the studies of epidemics. These undoubtedly had happened from time to time but the earliest complete account we possess is of the outbreak at the Hotel Dieu in Paris in 1746, in which almost every person affected with the disease died. Lying-in hospitals, were established in England at about 1750 and shortly after outbreaks of puerperal fever took place in London, Dublin and Edinburgh. Kirkland, writing in 1774, recognized that the disease was contagious and gives a remarkably clear account of the symptoms of puerperal fever. He stated that it was always the result of inflammation of the uterus and that it was caused by the absorption of putrid material. The source of this might be the putrid effluvia which is often present in lying-in hospitals arising from the local discharges, but that the disease might also develop from any form of wound decomposition. Kirkland was also one of the first to insist on drainage and the decomposing products from the uterine cavity. He also antedated Fowler by over two centuries in advocating position in the treatment of peritoneal affections. In one case he contemplated giving an antiseptic douche but contented himself with "desiring the patient to be raised in bed two or three times, which seemed to forward the discharge. From this method of treatment I had the pleasure of seeing her recover." Gordon, of Aberdeen (1795), must be given credit for first clearly demonstrating the infective nature of puerperal fever. He relates many instances

in which he himself carried infection and was able to place many more cases to midwives. At this period and for many subsequent years puerperal fever was universally recognized as a specific disease affecting pregnant and puerperal women and closely associated with modifications in the blood and changes in the anatomical condition of the pelvic organs. It was also generally recognized that the acute epidemic diseases such as scarlet fever, erysipelas and typhus fever were intimately related to puerperal fever, and were capable of producing the disease in all lying-in women. The importance of isolation of all cases suffering from the disease, an abundance of fresh air, and strict cleanliness during the puerperium were insisted upon, thus Collins who was the Master of the Rotunda Hospital from 1826 to 1833, adopted a method of the disinfection of the walls by chlorine gas and chloride of lime, and also carried out disinfection of the bed linen and blankets by stoving, and by these means was able to completely eliminate the disease during his tenure of office.

The year 1843 was an epoch one in medical history. In that year Oliver Wendell Holmes, who deserves to be remembered for his medical services, rather more than as an author, published his classical essay on the contagious nature of puerperal fever. In it he proved by overwhelming evidence from the experience of English and American obstetricians that the disease was frequently carried from patient to patient by physicians and nurses. In spite of the proof set forth in his paper he was strongly opposed by leading American obstetricians and it was not until about 1851 after the brilliant struggles of Semmelweis that the true nature of the disease received general credence.

In 1846 Semmelweis was appointed assistant of the Lying-In Hospital of Vienna at that time in charge of Professor Klein. The mortality of the hospital in that year was as follows: in the first division, attended by medical students, out of 4010 deliveries, 459 women died, a mortality of 11.4 per cent. In the second division attended by midwives out of 3754 deliveries, 105 died, a mortality of 2.7 per cent. This difference in mortality was striking but it was not until the following year that a cause for the difference was suggested to him. In that year a colleague died of pyemia due to a wound infection acquired at an autopsy. The condition of the body after death was entirely similar to that of women dying of puerperal fever and Semmelweis concluded that his colleague's death as well as puerperal fever was caused by the introduction of cadaveric poison. This explained the high mortality in cases of labor attended by the students, who habitually went from the dissecting room to the maternity,

after adopting only a most superficial cleansing of the hands. Semmelweis immediately adopted cleansing of the hands of the students by chlorine water and at a later period by chloride of lime. This simple procedure was followed by an immediate reduction in the mortality which fell during the first year to 3 per cent., and the following year to 1.2 per cent. Semmelweis devoted the remainder of his life to the propagation of his teaching, which, however, was received with the greatest ridicule and opposition by many of the obstetric teachers of the day. While he changed his views in regard to cadaveric poisoning being the sole cause of puerperal infection he maintained that practically all cases were caused by the introduction from without of some poison into the genital tract of the woman. As a corollary to this he held that infection could be prevented, though he believed that a small number of mild cases were due to autoinfection. He urged that the hands of the obstetrician should be disinfected and this extended to all instruments and dressings that were to be used during the labor. He also insisted on the necessity of the separation of infected from clean cases.

Semmelweis died in 1865, a victim of blood poisoning, the identity of which with puerperal fever he was the first to point out.

The work of Pasteur (1860 to 1863) placed our knowledge of infections on an absolutely scientific basis and Lister in 1867 made 'it possible for us to apply the truth of Pasteur's investigation to prevent and in a measure to cure puerperal infections.

In spite of all the investigations which have been made, puerperal septicemia still exacts a terrible toll upon the women who bring children into the world. I regret in presenting the following statistics that I must confess to their inaccuracy. I am sure that they underpresent the truth of the frequency and mortality of the disease and I regret that I cannot portray the picture more vividly, so that a very strong impression would be made on the minds of my hearers of the mortality and morbidity of this preventable infection.

In gathering the statistics of puerperal infection I wrote to all the hospitals of Philadelphia with the exception of those organized for special diseases and which do not treat or admit septic cases. Of all the hospitals written to thirty-two sent me their last published annual report. Of these, three (Jefferson, St. Vincent's and North-western General) do not tabulate the cases treated and cannot therefore be used in this study. Nine hospitals (Maternity, Mt. Sinai, Germantown, St. Luke's Homeopathic, Women's Southern Homeopathic, Chestnut Hill, German, Gynecean and Women's Homeopathic) do not report a case during the year of the report. Twenty

hospitals (Episcopal, Howard, Pennsylvania, Women's Medical College Hospital, Douglass, St. Agnes, Medico-Chirurgical, Stetson, Philadelphia Lying-In, Hahnemann, Jewish, Women's Medical, Jewish Maternity, Samaritan, St. Mary's, St. Timothy's Polyclinic, Presbyterian, West Philadelphia Homeopathic and University of Pennsylvania) report, during the year of their annual report, ninety-four cases of puerperal septicemia with twenty-seven deaths, a mortality of 28.72 per cent. During the same period there were reported to the Bureau of Vital Statistics of Philadelphia ninety-five deaths from the same cause. If the percentage of deaths would hold true this would mean that there were 331 cases of puerperal septicemia during the same year in Philadelphia. This estimation is of course incorrect as the mortality is based on hospital statistics which are much higher than those in general practice. As a rule, it is only the worst cases which are admitted to the hospitals. My experience at St. Agnes Hospital is that the cases are not admitted, as a rule until they have had fever for about a week and are almost moribund. It is impossible to estimate with any accuracy the mortality of puerperal infection in general practice but assuming it to be 10 per cent., which I believe to be a high estimate, it means that practically 1000 cases occur each year in Philadelphia. If we would consider under the head of infected cases those in which there is a rise of temperature above 100° for more than twenty-four hours, during the first eight days of the puerperium the frequency of the condition would be markedly increased. Many of this class of patients are erroneously classed under the type of milk fever.

The total number of deaths reported as due to affections connected with pregnancy in the United States during the census year of 1900 was 9699 and the proportion of deaths from these diseases in 1000 deaths from all known causes among females was 20.7. In 1890 the corresponding proportion was 28.5. These figures include deaths due to all accidents of pregnancy but in the reduction of mortality puerperal septicemia plays a part.

The following figures show, I believe, very conclusively the value of medical attendance during pregnancy. It is an oft-repeated statement, though I have not been able to find any figures to substantiate it, that puerperal infection is more common in cases attended by physicians than in those attended by midwives. It is well known that native-born women rarely employ a midwife, while the practice is most common among the foreign-born element.

The combined relations of age and race to the death rates from

affections connected with pregnancy are indicated, for the registration area (year 1900) in the following table, giving the death rates at fifteen to forty-nine years of age, per 100,000 of female population of corresponding ages by color and birthplaces of mothers.

White.....	45.7
Colored.....	57.4
Mothers born in	
United States.....	34.7
Ireland.....	45.1
Germany.....	52.7
England and Wales.....	50.7
Canada.....	45.6
Scandinavia.....	45.7
Scotland.....	33.7
Italy.....	121.7
France.....	22.5
Hungary.....	52.6
Bohemia.....	30.6
Russia.....	66.2
Poland.....	54.7
Other foreign.....	65.3

When we study this table we find that the white population which is able to command more expert care than the colored has a much lower death rate. Again when we compare the death rates among the mothers born in Italy, Russia, Poland and Hungary, which are the types, in Philadelphia, which make use of the midwife, with the rates among native-born mothers or those from countries where the midwife is not a national institution we find that the rate is doubled and trebled. The relation of the midwife to deaths due to the accidents of pregnancy is shown by the fact that the death rate among mothers born in Italy is only 25.9 in the rural districts as compared to 67.3 in the cities. The conclusion being that in as much as midwives are not common in the rural districts these women in the main have to have recourse to a physician during their labors.

The total number of deaths in the Registration Area of the United States during the year 1912, due to the puerperal state were 9035. These were divided as follows:

Accidents of pregnancy.....	863
Puerperal hemorrhage.....	923
Other accidents of labor.....	842
Puerperal septicemia.....	3905
Puerperal albuminuria and convulsions.....	2174
Puerperal phlegmasia alba dolens, embolus, sudden death.	276
Following childbirth (not otherwise defined).....	44
Puerperal diseases of the breast.....	8

This table shows that more women die of puerperal septicemia than from any other one cause connected with pregnancy and that it is the cause of 43.2 per cent. of all the deaths connected with child bearing. This statement is the more striking if we bear in mind that it is the one cause more than any other that is almost entirely preventable.

The 3905 deaths from puerperal septicemia in the Registration Area were divided into age periods as follows:

10 to 19 years.....	362
20 to 29 years.....	1933
30 to 39 years.....	1367
40 to 49 years.....	231
50 to 59 years.....	4
60 to 69 years.....	1

This table does not prove that one age is more susceptible than another. The difference in the frequency of the various age period bears a direct ratio to the frequency of births in the various age periods.

Puerperal septicemia is more prevalent in March and April and reaches its lowest ebb during September. Here again the cause is dependent upon the frequency of births at various periods of the year.

An interesting question connected with puerperal septicemia is that of morbidity. Unfortunately statistics are not available to show with any degree of exactness the number and variety of lesions which result from this disease. In studying hospital reports inflammatory lesions of the pelvis are not differentiated as to cause and consequently one is unable to draw any inference as to the number which were due to puerperal infection.

In the reports of twenty-six Philadelphia hospitals for one year 1921 patients were admitted with pelvic inflammatory lesions exclusive of endometritis. Of these 883 were operated on, exclusive of dilatation and curetment, with thirty-nine deaths. While all of these lesions were not due to puerperal infection many no doubt were. The majority of these operations consisted in a bilateral salpingo-oophorectomy so that in addition to the death toll some hundreds of women are annually unsexed in Philadelphia as the results of this disease.

While the figures given in this paper are not correct they at least do not exaggerate the incidence of the disease and its mortality and morbidity. We are all alive to the importance of the cancer question and are bending every energy to educate the profession and the

public as to its control. Yet here is a condition which exacts as many deaths as cancer of the female breast and about half as many as cancer of the female genital organs, which is practically entirely preventable and yet it has received but scant attention. Pennsylvania, I am happy to say, is taking up this question both directly and indirectly. Directly in a practical control of the midwife question and indirectly by demanding a higher standard of its medical graduates.

Year	Hospital	Puer- peral infec- tion	Deaths	Inflam- matory lesions of pelvis	Opera- tions	Deaths
1912	Episcopal.	15	9	79	57	3
1913	Howard.	1	0	162	71	2
1913	Pennsylvania.	3	0	45	21	0
1913	Women's Medical College.	7	1	37	15	0
1912	Douglass.	4	0	94	?	?
1911	St. Agnes.	11	3	118	101	0
1913	Medico-Chirurgical.	4	?	55	18	0
1913	Stetson.	3	1	33	9	2
1913	Philadelphia Lying-In.	2	2	0	?	?
1913	Hahnemann.	4	2	263	10	0
1913	Jewish.	3	0	41	42	2
1913	Women's Medical.	2	?	83	?	?
1913	Jewish Maternity.	1	1	?	?	?
1912	Samaritan.	4	1	204	95	16
1913	St. Mary's.	3	1	30	16	0
1913	St. Timothy's.	4	0	22	11	2
1912	Polyclinic.	2	0	71	33	1
1913	Presbyterian.	2	1	65	67	3
1913	West Philadelphia Home- opathic.	1	0	13	?	?
1913	University of Penn- sylvania.	18	5	174	171	?
1913	Maternity.	0	0	?	?	?
1913	Mt. Sinai.	0	0	30	28	1
1912	Germantown.	0	0	34	?	?
1912	St. Luke's.	0	0	40	?	?
1913	Women's Southern Home- opathic.	0	0	?	23	?
1912	Chestnut Hill.	0	0	5	7	?
1912	German.	0	0	135	88	7
1913	Gynecean.	0	0	59	?	?
1913	Women's Homeopathic.	0	0	20	?	?
	Totals.	94	27	1921	883	39

There is one source of danger, however, that has not been reached by legislation, and which I believe to be responsible for at least 50 per cent. of the cases which occur in cases attended by physicians. I have reference to the lay nurse. The nurse who knows more than the doctor and who has no conception of the meaning of the word obey. I see no reason why the lay nurse should not be licensed as well as the midwife and be compelled to pass an examination of the rudiments of midwifery before she can be licensed.*

THE PRESENT STATUS OF PUERPERAL INFECTION IN PRIVATE PRACTICE—PRACTICAL METHODS OF PREVENTION AND TREATMENT.

BY

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I HAVE watched with some credulity and tolerance the crusade waged by well-meaning people against tuberculosis, cancer, syphilis and gonorrhea, and have often wondered why we as a society have so far failed in our ideals and in our virility as to allow the present plan to continue of bringing our children into the world in haphazard fashion amid such surroundings.

I see little real change in the tubercular situation as regards the control of the disease or cure in any individual.

The same may be said of cancer or of social diseases, and yet, undoubtedly, the public movements have worked great benefit to the community.

Mr. President and Gentlemen of the Obstetrical Society, this paper is not merely meant as a whip to make you scrub your hands harder and longer; that same process has been gone over year after year, and apparently, to no avail, as I shall recite later.

We have reached the age when to accomplish any purpose, is requires more than the feeble cry of one or two men on one night in a meeting to produce results.

We must dignify the idea with the volume of a movement, we must back it up by publicity, we must sting the doctor through his patients' brains to greater expertness or to an awakening that such a movement is abroad and that we as the central society intend to inaugurate and push that movement to its final conclusion.

Should he be broadminded enough to grasp the idea and to live

*I am indebted to Lea's "Puerperal Fever" for much of the historical sketch.

up to it, he will be the one rewarded in fact, while we shall receive our reward in knowledge of another disease conquered.

What disease then is so vulnerable and so easy of conquest as puerperal infection? Certainly none of the ones cited in the first paragraph compare with it. From the time of Semmelweiss and Holmes to the present day we should have known the cause if we wanted to. Why then do not the general body of men remove the cause? If the money spent on tuberculosis were spent in the same fashion on puerperal infection, we could wipe it out in a few years. If the public, however ignorant, realized this fact, their response and help would be as readily forthcoming as in the more forlorn hope of tuberculosis.

If we filter our water and eliminate typhoid some such simple measure will reduce the mortality and morbidity from puerperal infection.

It would be well, therefore, that we make tonight the starting-point, and appoint a committee to take this matter up, even if it takes *years* to push the fact to conclusions.

The day will come when all of our babies will be born in hospitals. Enough hospitals for that purpose would cost less than our filter plants. If we can provide accommodations for all of our typhoid germs to go and have their young that we may be saved them having their litter in our households or ourselves, is the day so far off or are we so poor that we cannot if the need were realized, provide such for the human mother?

Every maternity case is as important as a case of appendicitis, and perhaps in any maternity case the apparently normal and simple may be in the fraction of a second changed to the most serious. When sudden action on the part of an unprepared doctor, from the use of unclean hands, instruments, or gauze, results in an infection, when he excuses himself on the ground of necessity for prompt action, the hospital solves the problem.

We are then dealing with this grave fact that we see to-day in our wards after full-term labor repeated cases of infection; in certain localities coming from certain men, but on the whole, sprinkled among many, which infections can have but one of two sources—either from the patient herself, or introduced from without.

So rare is the type arising from the patient herself that I should say the burden of proof was always upon the doctor to eliminate the possibility of something in surroundings or manipulations as causing the condition; or if an autoinfection, whether some toxemia untreated is not responsible for the inroads of the germs.

In rare instances the patient may have an acute infection at the time of delivery, from which the blood may carry to the placental site or to lacerations active germs. Such conditions are rare, however, and embrace diphtheria as an intercurrent disease, boils, vulvar abscesses, heart valve lesions, staphylo- or streptococcal, tonsillitis or chest infections.

There, however, arises at times, infection surely from the colon bacillus, more insidious in its action, perhaps, penetrating the tissues directly from a stagnant bowel or perhaps excited to unusual activity by a weakened patient. Such condition is manifested by a general peritoneal irritation and perhaps localizing somewhere in the abdominal viscera, appendix, gall-bladder, or kidney pelvis. Of such causes as these we have no control as to actual prevention, and any treatment is contained in the word, drainage.

As to infections from without, it then becomes evident that:

1. If your nurse is clean.
2. If she properly cleans the patient.
3. If you are clean.
4. If your instruments are clean.
5. If your dressings and bed linen are clean.
6. If all products of conception are removed.
7. If all wounds are sutured.
8. If you secure good drainage, you will avoid infections.

It would take more time than could be allotted to one evening to thoroughly cover all these points. We wish to present then for your consideration the most important practical points which the past decade has taught us.

If Your Nurse is Clean.—There is a world of meaning in that premise.

If we are to eradicate puerperal infection, the untrained, unclean nurse must go. If there is any one branch of medicine from which the untrained attendant should have been eliminated it is this department, and yet it seems impossible to make the most intelligent families understand this.

There can be no compromise on this question. After over ten years of active experience not one untrained nurse has come to my notice that was any safer than a match in a powder barrel.

Long ago I adopted the plan of having a printed list for nurse and patient, and yet, without exception, they will boil an instrument and then pick it up with their dirty hands to dry it on an ordinary towel and hand it to the doctor.

I know of no manner to control them. Even trained nurses who

have been out of hospital influences for years will need constant watching.

In all patients the field of operation should be perfectly cleaned, hair clipped and skin scrubbed; *bowels emptied* and linen clean. This devolves upon the nurse, and I have found the best plan to have printed an accurate list of the things to get, and how to sterilize the patient, the necessary dressings, sheets, towels, etc., for labor. Such a list may be found in any one of our obstetric text-books.

It has been my observation that perhaps the majority of puerperal infections in the hands of conscientious men are due to this type of nurse. To allow a nurse to give a *vaginal douche during the puerperium courts infection*.

The Surroundings and Linen.—The elimination of the old-fashioned bed from the delivery is a long step toward preventing infection.

The single bed with special sterile linen, the kitchen table for all operations, a particular room as the delivery room, well prepared, are all important adjuncts of prevention of infection in private homes.

If You are Clean.—We have reached the time after years of waiting when the delivery of a baby is conceded to be a surgical operation. If this society take up my proposal to start a crusade to have such surgical operations performed in hospitals where they belong, we can eradicate infections. Until then, if you are going to practice surgery in private houses, you must conform to the principles of surgery in each and every operation. You cannot attend scarlet fever and diphtheria and deliver babies. You must do all your pus work and examinations with gloves. You must wear gloves at all deliveries, for all purposes, whether for examination, delivery or repairs. And besides this, you must scrub your hands as hard and long as you would if you were not wearing gloves. I count the wearing of gloves the greatest safeguard against infection. They can be bought for fifty cents a pair and used, if cared for well, for several cases, being sure that they are boiled ten minutes before using, and do not become contaminated in putting on. If they come in contact with pus or infection they must be discarded.

Examinations of patients must be made so that the examining hand does not touch the skin before reaching the mucous membrane. It takes *two* hands to make an aseptic examination.

If you cannot change your street clothes, you should wear a gown or clean sheet over the street clothes. Cleanliness on your part means freedom from any form of infection in nose, ear, skin, or chest. You can buy a sterile hand scrub put up in wax paper, and use only

for one case. The ordinary scrub of the house bath room or you bag is filled with germs.

Your Bag and Instruments.—There can be no doubt that infection may lurk in a dirty bag. Bags cannot be sterilized, but they can be kept for this purpose and kept clean. A completely filled bag is somewhat heavy to carry if walking. It is not impossible, however, to pack into a medium-sized bag all the necessary articles for the aseptic care of patients. This should include: a pair of gloves, a gown, a sterile sheet, a compact sterilizer made of copper in which you can carry: Two double tenacula, one uterine dressing forceps, one needle holder, needles for perineum and cervix, catgut, silkworm-gut, glass douche nozzle, hemostats, scissors, silk for tying cord, and forceps. Usually the Simpson with tapes we have found suited to all cases possible of vaginal delivery.

In the bag also: two glass jars with 10 per cent. iodoform gauze for packing the uterus, a bottle of ergot, bichloride tablets, lysol, hypodermic syringe, hypodermic case, sterile hand scrub, and sterile douche bag. Of these twenty-three items, fifteen are to avoid infection.

Instruments must be boiled at least ten minutes.

You will notice that I omit a Kelly pad from my list. I consider that a most potent form of carrying infection, unless carefully covered with sterile sheet or towel.

The ingenuity of the modern supply house in putting up sterile packages is so marked an advance on ten years ago that there can be no excuse for your not being able to secure sterile articles done up in individual packages at a moderate price, and also may we add that there can be no excuse for the patients not having sterile dressings.

Immediate Suturing of All Tears.—I have, myself, and have seen others, with painstaking care, suture every slight wound in the face and scalp of a drunken wretch brought to the receiving ward.

What excuse can we find for allowing our mothers in childbirth to go unsutured as regards any wound of the same size. It is of great advantage to close all wounds wherever they occur in the genital tract.

Drainage.—Last on our list, but most important.

The modern bed, whether in house or hospital, is so constructed that when we put a patient on it, there are two angles of gravity drainage; one from shoulders to midlumbar region, and one from pelvis back to midlumbar region.

I am convinced that one reason why the woman in the lower

stratum of society gets up more vigorously and with better involution is because she starts up in bed early, secures good drainage, and by using gravity, encourages involution. The patient, however, who stays flat with a heavy fundus of the uterus sagging back over the brim of the pelvis and containing a stagnant pool of blood and detritus cannot get perfect involution and is open to infection and much more likely to have prolapse because of a permanently subinvolved uterus when she does get up. The sooner your patient is in the semi-Fowler position after the shock of delivery has passed, the freer the convalescence. There is needed only enough elevation to make the line of drainage from shoulders to pelvis without any stagnant points.

This brings us to the question of treatment, and a conservative estimate of the best treatment of all infections in the puerperal tract, if you are sure that the uterus is empty, is drainage, and more drainage, stimulation and then let alone.

If the cervix is blocked by a plug of tenaceous mucus, it is good surgery to wash out the uterus with 60 to 75 per cent. alcohol solution or swab with a weak iodine solution and then let alone.

Fowler's position, and rest. Then, next, sunlight and fresh air.

On the occasion of a visit to the Lying-In Charity in New York I found numbers of patients on a roof garden and was told that all types of puerperal infections were treated in that fashion with marked success. I have tried the plan on two distinct cases since then with what seemed to me wonderful results. A patient had been under observation and treatment six weeks for a puerperal infection following full-term delivery in the medical wards of the Presbyterian Hospital. She was sent to the gynecological ward to die. On the day of her admission to the latter ward, I examined her and with no more than the usual effort in such an examination, I easily pushed my finger through the vault of the vagina, the tissues were so soft, almost gangrenous. She had gone through all the usual serum and vaccine treatment with no results. I did nothing surgically, merely putting her in the Fowler position on an open porch, and felt her chance of recovery so slight that I did not see her until reminded by the resident at the end of one week that she was well. With forced iron medication and stimulating food she made a rapid recovery.

Within a short time another case came into the same ward direct, not in such serious shape, but quite ill, and markedly anemic. She was immediately placed in the same situation on hypodermic

ferric citrate and sodium succinate medication and made a rapid recovery.

Fowler's position for drainage and the prevention of lymphatic or blood extensions; stimulants, hypodermic iron, fresh air and sunlight with warmth.

If I may trespass on your time, I have two other suggestions, if your city wishes to eradicate puerperal infection.

Both of the above cases were Italians, and one had been delivered by a midwife. The midwife must be eliminated before you can stamp out puerperal infection. There can be no doubt that the majority of midwives are a menace rather than a help to the poorer class of patients.

The second suggestion touches the original proposal.

The delivery of cases in the slums by fourth-year medical students is but one step higher than midwife delivery.

We believe that the maternity hospital accommodations of our cities should be ample to accommodate all charity cases, and that our undergraduates should attend the cases in the hospital, that they may be taught aseptic care of the case.

As a matter of fact, it is impossible for the students or anyone to secure the proper surroundings in any homes we go into, and no one can be blamed for infection in houses where a clean sheet is a distinct rarity.

The city or some one should provide hospital accommodations for all cases which an investigating city nurse can say cannot secure good surroundings; and, above all, for all toxemic cases. This in the interests of maternal and fetal mortality.

4005 CHESTNUT STREET.

PRIMARY MALIGNANT TUMORS OF THE FEMALE URETHRA.

WITH REPORT OF A CASE OF CANCER AND A CASE OF MYXOSARCOMA.

BY

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(With six illustrations.)

MALIGNANT tumors are not of frequent occurrence as primary growths in the female urethra. In 1890 Ehrendorfer directed attention to the condition, and in 1895 Melville Wassermann collected the cases up to that date, tracing twenty-four in all. In

many of these, however, the disease was not primary. In 1903 Percy collected sixteen cases of undoubted primary cancer of the urethra, and in 1908 McMurtry added eleven, making a total of twenty-seven cases up to that date. In 1910 Manton found records of thirty-five, and in 1911 Whitehouse collected forty-three. He was careful to exclude all where the condition was possibly secondary, or in which no microscopic examination had been made. Since 1911 I have been able to trace records of eight cases, one by Fairbairn, three by Lockyer, one by von Engelhardt, one by Palais, one by Jacquard, and one by Horand, to which the case I am about to record may be added, making a total of fifty-two.

That the condition is of more frequent occurrence than those figures would indicate is probable. McMurtry, from his inquiries among surgeons at the time of the publication of his paper, was led to conclude that many cases had not been reported. There is a considerable amount of confusion in the literature, owing to the inaccuracy and incompleteness of many of the reports, but taking this into consideration primary malignant disease of the female urethra must be regarded as one of the rarer neoplasms.

Within the past year I have met with two cases, one of primary cancer, the other of myxosarcoma.

CASE I.—Miss H., aged twenty-seven, nullipara. For four or five months before being seen the patient had noticed constant discharge from the vulva. At first watery in character, it gradually became thicker in consistence, and was occasionally blood stained. For two months she had noticed a swelling in the vulvar region, and during that time there had been occasional twinges of pain, but these were never severe. She consulted a doctor, who, finding a growth in the vulvar region, informed her that she was suffering from syphilis. Not being satisfied she consulted another doctor, who referred her to me.

On examination a fungating mass was found filling up a considerable part of the vestibule (Fig. 1). In the center of it the orifice of the urethra was situated. The growth extended more toward the floor than the roof, and infiltrated the lower wall to a distance of half an inch above the orifice. The surface of the growth was hard, friable, and bled easily. The inguinal glands on both sides were large, hard and matted. A piece was excised from the primary growth, and examination showed it to be a squamous epithelioma (Fig. 2).

The patient was admitted to the hospital, and under general anesthesia a wide excision of the growth was made. The parts removed included the greater part of the mons veneris and upper parts of the labia majora, the whole of the body of the clitoris, labia minora, the vestibule, and lower part of the anterior vaginal wall, including the lower two-thirds of the urethra.

Hemorrhage was exceedingly free. The raw surface was closed by sliding in the tissues from the side, and the stump of the urethra was attached through the anterior vaginal wall, a permanent catheter being left in the bladder. As the operation had taken a considerable time, and the patient lost much blood, the removal of the inguinal glands was not undertaken. Ten days later, after union of the vulvar and urethral wounds had occurred, the glands on both sides were freely removed. Microscopical examination of these failed to reveal any sign of malignant invasion. They were not, however, cut serially.



FIG. 1.—Shows the tumor of urethra fungating into the vestibule.

The patient made an excellent recovery. She had perfect control of the urine from the time the catheter was removed, a week after operation.

In order to guard if possible against recurrence she had several x-ray exposures, and later radium treatment. She had in all six x-ray exposures. Radium treatment was begun two months after the first operation. She had several exposures on successive days, making a total of 270 milligram-hours. Three weeks later she had further successive exposures, amounting in all to 600 milligram-hours to the vulva, and 150 milligram-hours to the groins. A month later she had two further exposures, amounting to 60 milligram-hours.

As a result of the radiation the vulvar and inguinal scars became quite soft and pliable. So far (a year after operation) there has been no recurrence. The patient, without my knowledge, was married six months ago, and no disability has resulted. When seen a week ago, she had put on 7 pounds in weight, the scars were

soft and pliable, there was no thickening in the groin. The urethral orifice is situated well inside the vulvar orifice, in the anterior vaginal wall. The act of micturition is perfectly natural. It is of course too soon to say whether a cure has been effected. The youth of the patient made one give a bad prognosis at the time of operation, but conditions now look hopeful.



FIG. 2.—Section of tumor shown in Fig. 1. A squamous epithelioma.

CASE II. *Sarcoma of the Urethra*.—L. E., aged fourteen, a Jewess, was admitted to the Gynecological Service in the Toronto General Hospital, complaining of a swelling in the vulvar region, accompanied by profuse discharge. Four weeks previous to admission she had complained of some frequency of and pain on micturition. For this her doctor had prescribed a urinary sedative, but had made no examination. Three days before admission the patient called the attention of her mother to a swelling in the vulvar region, and the patient was sent into hospital with a diagnosis of polypus, probably uterine.

She was a girl rather tall for her age, and well developed. Menstruation had been established for two years. On separating the thighs a rounded hard swelling was visible protruding from between the labia, and bulging in the perineum (Fig. 3). It was covered with dark offensive discharge, and looked gangrenous in parts. On separating the labia it was found that the mass was not protruding from the vagina, as at first it appeared to do, but was springing from the region of the vestibule. The clitoris, the labia minora, and a small area of the vestibule below the clitoris, were perfectly free. Behind the mass the finger could be introduced into the vagina, and a considerable amount of thickening along the line of the urethra

detected. At the lower pole of the tumor the finger entered a cleft, and this led directly into the urethra. The urethral canal was greatly dilated, admitting the index-finger with ease. Its walls were studded with rounded projections, and on introducing the finger into the bladder similar nodules could be felt. A small piece was removed, and examination showed it to be a myxosarcoma. There was no enlargement of the inguinal glands.

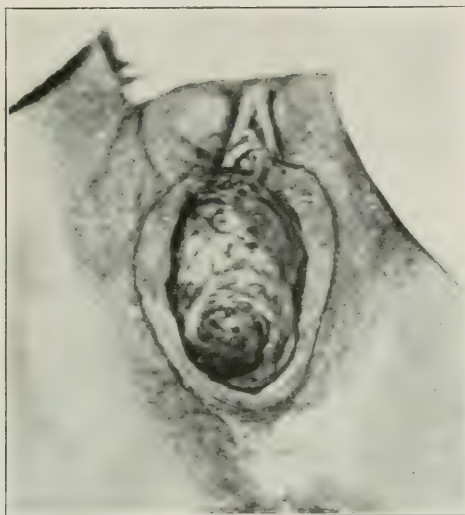


FIG. 3.—Sarcoma of the urethra forming a large tumor mass protruding between the labia.

The case was obviously inoperable, and the patient went home after a few days. She became rapidly emaciated, and died four weeks later, and we were fortunate enough to obtain permission for a post-mortem examination of the abdomen. All the pelvic organs, together with the tumor mass and the vulva, were removed entire. Both kidneys were considerably enlarged, and in a condition of acute nephritis. The pelvis of the right kidney was distended with pus, and the ureter was dilated. The pelvic organs were hardened in formalin, and then cut in vertical mesial section (Fig. 4).

It will be seen that the uterus and vagina are healthy in appearance. The urethra is dilated, and its walls enormously thickened by the presence in them of an infiltrating growth. At the urethral orifice this growth projects, forming the tumor which was visible between the labia. The projection continuous with the anterior wall is larger than that continuous with the posterior. Between the two is

the cleft through which the finger reached the urethra. The bladder walls are greatly thickened, and infiltrated toward the mucous surface with a growth continuous with that in the urethra. On section the tumor is of a pale fatty color, with occasional hemorrhagic streaks and patches.

Sections taken from the projecting part of the tumor mass, from the wall of the urethra, and from the bladder, show the growth to be a sarcoma. The cells are mostly of the spindle variety, the blood-vessels are thin walled, and the stroma is myxoid in character. In some areas there are only a very few cells. In the free part of the tumor blood-vessels are numerous, and have somewhat thicker walls than in other regions. In the bladder the growth is confined to the

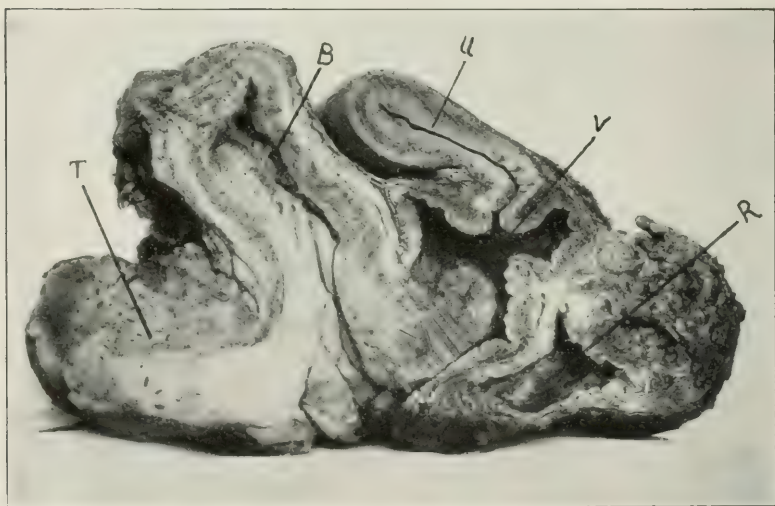


FIG. 4.—Sarcoma of Urethra. Pelvic organs removed *postmortem*, cut in vertical section. T. Tumor protruding from vulva. B. Bladder. U. Uterus. V. Vagina. R. Rectum.

mucosa, and has apparently spread along it from the urethra. There is little or no invasion of the muscle which is thickened and hypertrophied.

The tumor had evidently begun in the wall of the urethra, close to the external meatus, forming there a projecting mass. It had then infiltrated backward along the urethral mucosa to the bladder, and then spread diffusely over the bladder wall.

I have been unable to find in the literature any record similar to that of the case of sarcoma of the urethra just described.

The case of cancer belongs to that type described by Winckel as "vulvourethral." In Whitehouse's investigation he found that thirty-two out of the forty-two cases came under this category. He describes three clinical types:

1. *Vulvourethral*.—The most common. Thirty-two of the forty-three cases included in Whitehouse's list come under this category. It includes three clinical types.

(a) An irregular dark papillomatous growth, bleeding readily on contact, and resembling a simple polypus or caruncle.

(b) An ulcer, due to breaking down of a nodule on the floor of the vestibule at the urethral orifice. The ulcer presents the ordinary malignant characteristics, having a hard, indurated, irregular margin, and a friable sloughing base. It rapidly involves the whole of the vestibule and spreads to the labia minora.

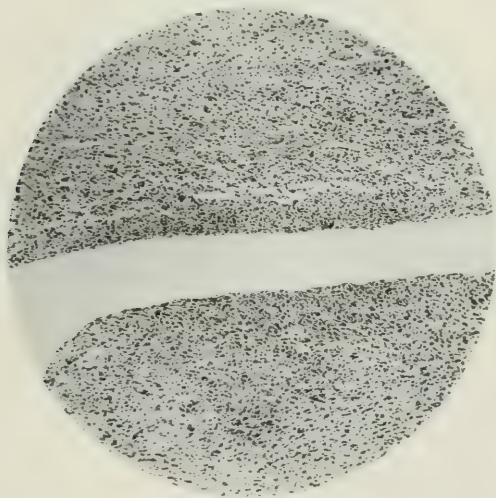


FIG. 5.—Section through the walls of the urethra, showing the sarcomatous nature of the growth.

(c) Induration around the urethral orifice, with depression, puckering and contraction of the orifice, but no ulceration and proliferation. This variety is of slow growth, and clinically is a scirrhus.

2. *Urethral Growths*.—Much less common. They include:

(a) An irregular elongated ulcer, involving the mucous membrane of the urethral canal, and usually situated in the distal segment, on the floor of the canal. It rarely involves the bladder, but tends

to extend toward the urethral orifice, and has the usual malignant characters.

(b) Periurethral induration, with no ulceration until the late stages. The tumor tends to occlude the canal, and involves the whole length of the urethra. It grows slowly, and approximates to the scirrhus. In the later stages there is ulceration of the vagina, urethra or vestibule.

Of the cases described since the publication of Whitehouse's paper two belong to the vulvourethral and five to the urethral type. The others cannot be definitely classified.

According to Whitehouse squamous celled epithelioma is the preponderating type of growth. His series of forty-three cases includes

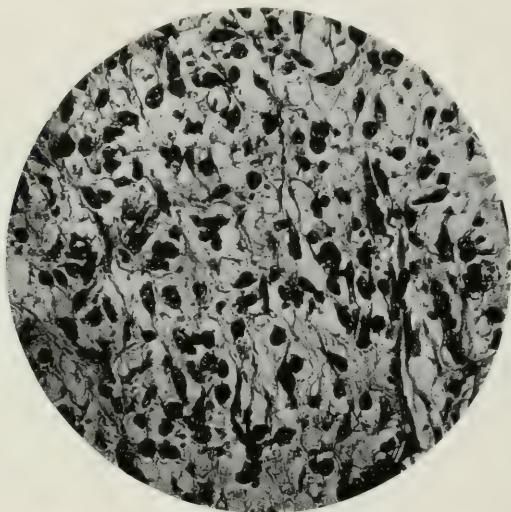


FIG. 6.—Sarcoma of Urethra. High-power view of area shown in Fig. 5.

twenty-seven of this type. Two other cases are described as a combination of epithelioma and columnar-celled carcinoma. Pure adenocarcinoma is rare. It originates in the periurethral glands, and only fourteen cases are included. Of the recently recorded cases six were squamous epithelioma (Fairbairn, Lockyer, Palais, Horand, Jacquard, Watson). One was a columnar carcinoma (Lockyer); two were adenocarcinoma (Lockyer, von Engelhardt).

The inguinal glands tend to become enlarged fairly early in the disease, and this must be borne in mind in the operative treatment. Fairbairn records a case of a patient who returned with glandular

enlargement seven weeks after removal of the primary growth. The prognosis after operation is better in the scirrhus forms than in the papillomatous, polypoid and ulcerating types.

Nothing much can be said regarding etiology. Urethral caruncle has been the starting point in a few cases. Preceding inflammation of gonorrheal or nongonorrheal origin has been a factor in some. In Horand's case the starting point was evidently an old stricture resulting from a preceding gonorrhea. It is somewhat strange that cancer should be so rarely met with in this situation. It is an area exposed to a certain amount of irritation and injury; there is a junction of two epithelial covered surfaces, conditions which are supposed to favor the occurrence of malignant growths.

The average age in the cases collected by Whitehouse was fifty-four, the youngest being twenty-six and the oldest sixty-nine. My own case was twenty-seven, Lockyer's forty-nine, von Engelhardt's fifty-one, Palais and Horand's fifty-three, Fairbairn's thirty-four.

The symptoms commonly present are difficult, painful and frequent micturition, discharge and hemorrhage. Pain is usually a prominent symptom, although not marked in my own case. In some, especially in the sclerosing type, there may be mechanical retention of urine.

The diagnosis should present little difficulty. In cases of doubt microscopic examination of a fragment should be made. Syphilis and benign tumor, such as a caruncle, are the principal conditions to be excluded.

Treatment should consist in early and free excision of the primary growth and both sets of inguinal glands, whether enlarged or not. Where the disease is confined to the anterior part of the urethra, as in my own case, it may be possible to leave a small portion next the neck of the bladder, and so retain sphincter action. In several of the recorded cases this has not been possible, for von Engelhardt had to remove the whole of the urethra and a portion of the trigonum and sphincter, together with the anterior vaginal wall. The patient recovered, but incontinence of urine persisted, although an attempt at the formation of a small urethral canal was made. In Jacquard's case total extirpation of the urethra, bladder and uterus was carried out, but the patient died of shock a few hours after. In cases where the sphincter has to be removed, together with part of the base of the bladder, it is probably better to close this completely and drain suprapubically. In the after-treatment the use of x-rays or radium is to be recommended.

BIBLIOGRAPHY.

- Ehrendörfer. *Archiv für Gynäkologie*, Band lviii, 463.
- Wassermann. "Epithéliome primitif de l'Urèthre," Paris, 1895. (Cases up to 1895.)
- Percy. Cited by McMurtry: Transactions of the American Surgical Association, 1908, vol. xxvi, p. 586.
- McMurtry. Transactions of the American Surgical Association, 1908, vol. xxvi, p. 586. (Cases up to 1908), and *Annals of Surgery*, 1908, vol. xlvi, p. 1032.
- Manton. "Primary Cancer of Female Urethra." *Surgery, Gynecology and Obstetrics*, 1910, vol. xi, p. 56. (Cases up to 1910.)
- Beckwith Whitehouse. "Primary Carcinoma of the Female Urethra." *Journal of Obstetrics and Gynecology*, 1911, vol. xx, p. 269. (Cases up to 1911.)
- Fairbairn. "Primary Carcinoma of the Female Urethra." *Journal of Obstetrics*, 1911, vol. xx, p. 306.
- Cuthbert Lockyer. Proceedings Royal Society of Medicine, Jan., 1912. Obstetrical Section, p. 136.
- von Engelhardt. "Das primäre Karzinom der weiblichen Urethra." Inaugural Dissertation, Munich, 1912.
- Palais. Du Cancer primitif de l'Urèthre chez la Femme." *Arch. mensuelles de l'Obstétrique*, May, 1913, p. 501.
- Jacquard. Jahresbericht über die Fortschritte auf dem Gebiete der Gynäkologie, 1913, Band xxvi, 328.
- Horand. Jahresbericht über die Fortschritte auf dem Gebiete der Gynäkologie, 1913, Band xxvi, 328.
- 14 MADISON AVENUE.

PERITHELIOMA OF THE UTERUS.*

BY

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(With two illustrations.)

WHETHER the so-called peritheliomatous tumors should be recognized as a definite pathological entity, or classed along with the endotheliomas or sarcomas, is a question into which I do not propose to enter at the present time. No great harm can result from the retention of the term so long as we clearly understand what we mean by it. Practically all pathologists are agreed that the term should be limited to designate a tumor, the cells of which arise from the endothelium of the perivascular lymphatics, and which range themselves round and radiate out from the vessel lumen, the endothelial lining of

*Read at a meeting of the New York Obstetrical Society, February 10, 1914.

which is intact. The tumor is therefore really an endothelioma, and getting further back still a sarcoma. So far very few tumors of this type have been recorded as occurring in the uterus.

Doran and Lockyer (*AMER. JOUR. OBST.*, November, 1908), report a case of peritheliomatous degeneration of a fibroid, in which a large pale cystic uterine growth had penetrated deeply into the left broad ligament. Sections from the uterine wall, Fallopian tube, ovary and tumor showed that it was a perithelioma. The whole of the tumor was involved in the cystic change, its form and consistence resembling a case of hydramnios. When taken out it resembled a uterus distended with fluid, but was pale white instead of red,



FIG. 1.—Perithelioma of uterus.

owing to the amount of distention. The age of the patient confirmed the common experience that fibroids often given rise to trouble late in life.

In the Proceedings of the Royal Society of Medicine, October, 1908, they also report two cases of perithelioma in fibromyomata of the uterus, one patient having remained alive and well for four and a half years after operation, and the other for two and a half years after operation. In the latter case rapid recurrence had been expected when the operation was performed, as it was doubtful if the growth had been completely removed.

With Dr. Barbour I reported a case of perithelioma of the uterus in the *AMER. JOUR. OBST.* for September, 1911. The patient was a married woman aged fifty-eight, who had had three children. The

menopause occurred at the age of forty-eight. She stated that for four months she had had a white discharge from the vagina, which subsequently became blood stained, and that she had noticed a swelling in the lower part of the abdomen two weeks before. A diagnosis was made of fibroid tumor undergoing degeneration, and the uterus and the greater part of the cervix removed. Microscopical examination of sections from the parts removed showed that the growth was a perithelioma, involving the fundus, the upper two-thirds of the anterior wall and the upper third of the posterior wall of the uterus. The tumor was of a yellowish-white color on section, and similar to brain tissue in appearance and consistence. It showed many hemorrhages, and resembled an ordinary sarcoma.

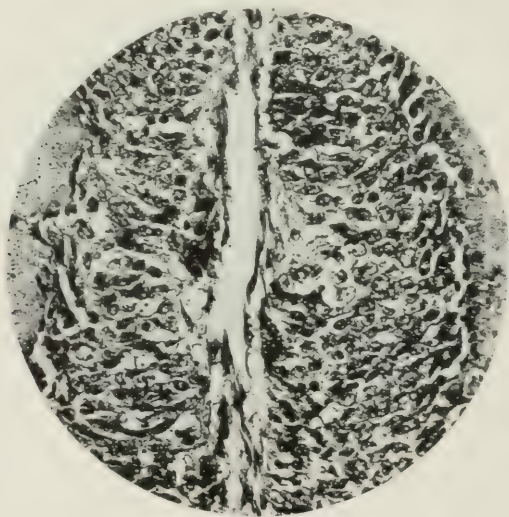


FIG. 2.

More recently Dr. Barbour has reported the case of an unmarried woman aged sixty-two, who had had a large fibrous polypus removed from the uterus seven years previously. She stated that for two years she had noticed a swelling in the abdomen, and had been weak and easily fatigued, but had not suffered from any pain. A tumor, the size of a seven months' pregnancy, was removed by supravaginal hysterectomy. It consisted of one large cavity, containing more than two pints of blood-stained serous fluid. The walls exhibited the structure of a uterine fibroid, the cavity being partially lined by soft yellowish-white breaking-down tissue, showing the changes of

perithelioma. The uterine cavity extended around a third of the tumor, and had a similar relation to it as a large interstitial fibroid.

Fletcher Shaw reports the case of a woman aged forty-four, who came under his observation in January, 1911, with a history of menorrhagia and metrorrhagia of two years' standing. A fibromyomatous polypus was removed from the uterus, and there was complete amenorrhea until April, 1913, when severe hemorrhage commenced. A large polypus was found protruding into the cervix. The uterus was removed by vaginal hysterectomy. Section of the polypus showed it to be a fibromyoma extensively invaded by perithelioma, the large cells of which were collected radially around the blood-vessels. On October 17, 1913, there was no sign of recurrence.

The condition cannot be so rare as the small number of cases on record indicates. Many of them have been described as sarcomas, and many others, occurring as secondary changes in fibroids, have not been recognized at all.

In all the cases that have been quoted the tumor has arisen in a preexisting fibroid, or has itself formed a large tumor in the uterine wall. In the case I am about to record the growth was a small one, originating apparently in the mucous membrane of the body of the uterus.

CASE.—Mrs. W., aged fifty-eight, para-i. The patient had her first and only child at forty-five years of age. The menopause occurred two years later, and from that time until a year ago there was no hemorrhage from the vagina. One year ago, when the patient was fifty-seven, she noticed a watery vaginal discharge, and occasionally a streak of blood. The discharge and blood were intermittent, and the patient did not seek advice until nine months later. Two weeks before I saw her the uterus had been curetted, and I had an opportunity of examining the tissue removed. It exhibited the characters of malignancy, but it did not conform to any of the ordinary types of carcinoma or sarcoma of the body of the uterus. There were large cells of epithelioid character, arranged in rows, and in one or two places arranged radially to a vessel lumen. A diagnosis of endothelioma or perithelioma was made, and hysterectomy recommended.

The patient was extremely stout, so that access by the abdominal route would have been exceedingly difficult. The uterus was therefore removed by vaginal hysterectomy. The operation was rendered extremely difficult by the fact that the uterus would not pull down, and the very free hemorrhage which occurred from all cut surfaces, and because of the extreme stoutness of the patient.

She made a good recovery from the operation. Subsequently, however, she developed a squamous epithelioma involving the anterior vaginal wall near the orifice, and involving the urethra, with enlargement of both sets of inguinal glands.

Description of the Uterus.—The uterus measures 3 inches in length and 2 in breadth. It is rather more rounded in shape than usual. The vaginal portion of the cervix is healthy, and the peritoneal surface is intact. On opening the uterus along the anterior wall a small irregular projection is seen on the mucosa of the posterior wall, about the middle of the body. It measures 2 centimeters in breadth and 2 centimeters in vertical diameter. The rest of the mucosa is healthy in appearance.

Microscopic examination shows the growth to be a typical perithelioma (Figs. 1 and 2). Parts of the growth are quite necrotic, but the greater part consists of masses of large cells arranged radially to blood-vessel lumina. The growth is for the most part confined to the mucous membrane, in which small atrophied glands are still visible. The base of the growth has infiltrated the superficial muscular layers to a slight degree. In this region the typical peritheliomatous structure is not seen, the cells forming somewhat irregular columns and masses.

BIBLIOGRAPHY.

Doran and Lockyer. AMER. JOUR. OBST., Nov., 1908, and Proceedings Royal Society of Medicine, London, October, 1908.

Barbour and Watson. AMER. JOUR. OBST., September, 1911, p. 105.

Barbour. AMER. JOUR. OBST., August, 1913, p. 61.

Fletcher Shaw. AMER. JOUR. OBST., October, 1913, p. 221.

14 MADISON AVENUE.

EXPERIENCES WITH A METHOD OF IMMEDIATE REPAIR OF PERINEAL LACERATIONS.

BY

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(With seven illustrations.)

In spite of Dr. Karl Hegar's idea that immediate repair of the perineum is of very little importance and that binding the legs together in a large part of cases is sufficient, most of the obstetricians agree that the immediate repair of perineal lacerations, no matter how slight, should be insisted upon. The fact that immediate repair of perineal lacerations does not give uniformly good results is no argument against making the attempt, because there is no procedure that can be performed by a surgeon that gets uniformly good results.

In my work I must confess that the results of sewing the perineum according to the methods usually employed have not met with brilliant success. Since I have adopted the plan of procedure that I am now using and have used for several years in the past, which I call the "Robins Method" after Dr. Charles R. Robins, who devised the plan, my results have been good in almost every instance.

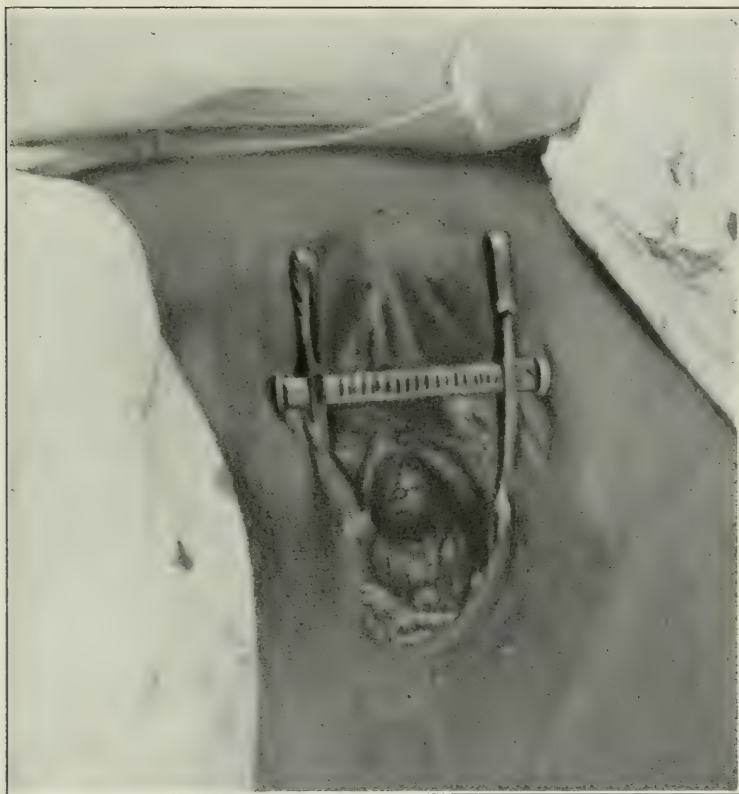


FIG. 1.—Speculum in place showing tear.

While I have tried a good many different methods I have never tried the method suggested by Chas. Jewett, A. L. Smith, A. Sturndorf, namely, the placing of sutures of silkworm-gut in the perineum before it is torn and then removing them if the perineum does not tear, nor have I tried the methods suggested by Dr. Brook N. Anspach, of using buried sutures of catgut in the muscles of the

vagina in which he reported 200 cases that have recovered without trouble.

Bernhard Schutte reported from the Frauen Klinik, Berlin, upon 14,200 deliveries from January 1, 1905 to January 1, 1910, that 2671, 18.5 per cent., had a tear of some sort. 1863 had first-degree tears, 704 had second-degree tears, twenty-four had third-degree tears.



FIG. 2.—The forceps grasping the highest point of the tear.

From April 1, 1905 to April 6, 1906 of the 370 tears, 352 healed by first intention, eighteen healed by second intention.

All of these tears were repaired immediately after they happened, the vaginal portion being sutured with catgut, the perineal portion being sutured with silkworm-gut and afterward powdered with iodoform.

In 1909 the outside perineal portion was sewed with Michel's

clamps. Of the 127, 125 healed by first intention. The inside was sewed with silk or wire.

Bucura reports from Chrobach's Clinic that in 1901 there were 3333 births. There were 313 tears sewed that healed.

	No fever.	Light fever.	Fever.
By first intention, 279—89.2 per cent. of these.....	269	5	3
Sutures cutaneous by primary, 2—0.6 per cent. of these..	1	.....	1
Part by primary, 14—4.5 per cent. of these.....	13	.....	1
Secondary, 18—5.7 per cent. of these.....	7	3	7



FIG. 3.—Catgut suture introduced at the highest point of the tear in the left sulcus.

J. Eversman sews up the patients while lying on their side. He never needs to use anesthesia. If this be true, he certainly does

not have the class of women to deal with that I have encountered because I have found very few that would lie sufficiently still to be sewed up properly without the use of an anesthetic. He pulls the buttocks over the edge of the bed. One thigh and buttock is pulled up by an assistant; he uses a lysol solution on the wound, first cutting off loose tags, then places sutures into the skin down behind the end



FIG. 4.—The left sulcus completely repaired, mucous membrane and fascia having been brought together with a continuous catgut suture.

of the tear back out on the opposite side. His idea is to get behind and below the tear so there will be no reservoir for holding lochia. He uses silkworm-gut and advises the surgeon not to put his fingers in the wound. In 1040 cases delivered, fifty-nine had tears of the first degree. All got well. There were eighty-six of the second degree. One had a bad result with the fever, 28.6 per

cent. of those that tore had tears of the third degree with one bad result.

Dr. J. Milton Mabbott's idea is that the perineal sutures over the skin surfaces might be put in such a fashion that the greatest distance should be at the side of the tear. He introduces the suture in the skin surface and then passes it toward the ischial spines, taking in a large quantity of muscle with the sweep of his needle in order that

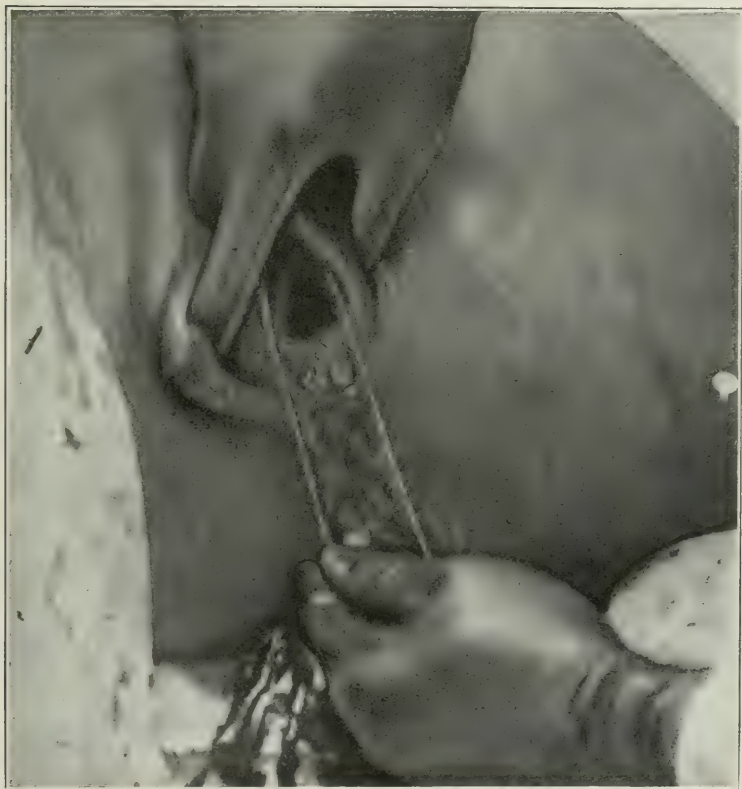


FIG. 5.—Continuous catgut suture completed for both sulci.

when the sutures are drawn, the greatest pressure will be over the point at the greatest distance and in consequence, the wound is held tightly together at the sides.

The plan devised by Dr. Chas. R. Robins in 1909 is as follows:

The procedure is simple; the most important things to consider are a good light and a good exposure of the torn area.

The patient is placed on her back with the thighs flexed on abdo-

men and held in place with a suitable support like the Robb-Kelly strap. The vagina is cleansed of clots and the upper part of the vagina packed with sterile gauze or cotton, so as to make the field of operation as bloodless as possible. Then a good light is thrown into the vagina. It is essential for the operator to see what he is doing because the parts are so distorted and bruised that it requires



FIG. 6.—The insertion of the needle from the skin surface through the muscles to the highest point of the sulcus of the left side to the highest point of the sulcus on the right into the muscles out through the skin on the left. Needle is then threaded with silkworm gut and withdrawn.

some discrimination to be able to recognize what parts belong together. Robins recommends sewing the mucous membrane and submucous fascia of the vagina to the mucous membrane and submucous fascia of the opposite side of the tear with a continuous chromicized catgut suture. Care must be taken not to catch the

muscles with the suture. The suture begins at the upper part of the tear in the vagina and is continued down toward the vulva, uniting the mucous membrane and fascia with a continuous running suture, the operator trying to match the part of one side to that from which it has been torn. This restores the shape of the vagina (the vaginal sheath). After the vulva has been reached, the suture and



FIG. 7.—The vagina and perineum after the crown sutures of silkworm gut have been introduced and after the skin has been united with one of the continuous catgut sutures from the left sulci, the catgut suture of the right sulcus having been tied and cut.

needle are laid in the vagina to be used later to unite the skin with a continuous suture. If there happens to be another tear in the vaginal sulcus or median line, which is almost always the case after the use of forceps, that tear is sewed, the mucous membrane and fascia to the

mucous membrane and fascia of the opposite side and when the vulva is reached, the suture is temporarily laid aside.

Then the crown sutures of silkworm-gut are put in from the skin surface just as is usually done, slanting downward and backward; but the rectum should not be entered, as sometimes happens, unless one introduces in the rectum a gloved finger. It is well to pull the wound well forward with the sutures before tying, to see that the perineum is well cared for; then they are tied. The catgut suture that was stopped at the opening of the vulva is then picked up, with a continuous suture the denuded surfaces are brought into apposition and the suture continued down the skin.

If the rectum has been torn, the sphincter ani may be caught and brought together by a silkworm-gut suture introduced in the skin just above the rectum, passing through the muscle and out at the other side through the skin. A similar suture just above the mucous membrane of the rectum, introduced from the skin, passing around the tear in the rectum and coming out on the skin of the opposite side, will draw the mucous membrane down like a purse-string.

When the sewing is aided by a good light the result is well-nigh perfect.

The continuous suture brings the denuded and torn surfaces so close together that there is no seeping of lochia or of infectious material and the muscle sutures have a chance to hold.

The distribution of perineal tears and the bearing upon instrumental delivery in producing perineal tears in 158 delivered among private cases was as follows:

Primiparæ.....	80 in number
Instrumental deliveries.....	19—23.95 per cent.
Tears with instrument.....	12—63.78 per cent.
Deliveries without instrument.....	61—76.05 per cent.
Tears without instrument.....	4— 6.00 per cent.
Multiparæ.....	78 in number.
Instrumental deliveries.....	8—10.25 per cent.
Tears with instrument.....	2—25.00 per cent.
Deliveries without instrument.....	70—87.65 per cent.
Tears without instrument.....	3— 4.28 per cent.
Total No. cases delivered with instrument.....	27—17.08 per cent.
Total No. tears with instrument.....	14—15.85 per cent.
Total No. cases delivered without instrument.....	131—83.00 per cent.
Total No. cases torn without instrument.....	7— 5.20 per cent.
Total No. tears in series.....	21—13.29 per cent.
Of all delivered including those delivered with instruments.	

The tears were distributed as follows:

Tears of first degree.....	9
Tears of second degree.....	11
Tears of third degree.....	1

In the series sewed by the Robins method all of the first degree healed perfectly, all of the second degree healed by intention except one, and that was in the case of the most intractable woman that it has been my misfortune to attend. The third degree tear healed only partly. She has entire control of her feces but a bad rectocele and she should be operated upon for the relief of this condition.

Olshausen reported unavoidable tears of the perineum in primiparæ in 15 per cent. of his cases.

Schroeder reports that great care must be taken in primiparæ to have as small per cent. as 15 per cent. or 20 per cent. of tears.

BIBLIOGRAPHY.

Immediate Suture of Ruptured Perineum. Spencer Sheel. *The Practitioner*, vol. lxxii.

Lesions of Pelvic Floor during Labor. Rostach Schatz. *AMER. JOUR. OBST.* vol. xvii, 884.

A new Technic in Perineorrhaphy. Charles Jewett. *Long Island Medical Journal*, ii, 1908.

A New Method of Immediate Repair of Perineum. Chas. E. McGirk. *Am. Medicine*, Jan. 21, 1905.

Consideration of Recent Perineal Lacerations. Genevieve Clark, *Annals Gynecol. and Pediat.*, 1905.

Treatment of Wounds and Contusions of the Pelvic Outlet during Labor. J. W. P. Smithwich. *Annals Gynecol. and Pediat.*, 1905.

The Use of Buried Catgut and Intercutaneous Suture in Plastic Operations on the Perineum. Brooke M. Anspach. *Univ. of Pa. Medical Bulletin*, 1908-1909.

Laceration of Perineum Incident to Pregnancy, Pathological Anatomy and Clinical Findings. Charles R. Robins. *Virginia Med. Semi-monthly*, May 8, 1903.

Prevention and Treatment of Laceration of Perineum. Marvin F. Nuchols, M. D. *Va. Med. Semi*, May 8, 1903.

Ueber die Behandlung der frischen Dammrisse. Constantin J. Bucura (Chrobach's Clinic, Wien). *Münchener med. Wochenschrift*, No. 1, Jan. 5, 1904.

Muss jeder frische Dammriss genäht werden Von D. Karl Hegar. *München. med. Woch.*, No. 1, March 31, 1904.

Ueber die Behandlung des frischen Dammrisses. J. Eversman. *Zentralblatt für Gynäkologie*, 1904. No. 18.

Remarks on Perineorrhaphy, Chiefly in Reference to the Mechanics of Deep Sutures. J. Milton Mobbott, N. Y. M. J., April 14, 1900.

A Discussion of Perineal Tears. John Egerton Cannady. Transactions Am. Association Obstetricians and Gynecologists, 1906.
26 NORTH LAUREL STREET.

SPONTANEOUS EVOLUTION IN SHOULDER PRESENTATION WITH A REPORT OF THREE CASES.

BY

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SHOULDER presentations are said to occur about once in 200 labors, and, according to Edgar (*The Practice of Obstetrics*, fourth edition), spontaneous evolution occurs in about 8 per cent. of all cases, if unusually small children, premature births, etc., are included. It is well understood that there are three factors which must be present to make this spontaneous termination possible, these being large pelvis, small child and strong uterine contractions. The birth of a full-term living child has never occurred by spontaneous evolution, the heaviest child born alive having been reported by Zangemeister, the weight being 2700 gm. The writer has seen three cases and, owing to the rarity of the mechanism, he feels that a report of these cases would be of interest. In each case the mechanism was that described by Douglas.

CASE I.—Mrs. L., seen in consultation with Dr. H. S. Bartholomew, Sept. 25, 1901. The patient was a multipara, seven months pregnant and had been in labor for eighteen hours, before she was seen by Dr. Bartholomew and myself. At this time we found a shoulder presentation, the right arm lying in the vagina. Preparation was begun for a version but in a few minutes the patient was seen to be having very strong expulsive pains, the arm steadily advanced, then the right chest appeared, then the trunk of the fetus, with extreme lateral flexion, then the lower limbs and finally the opposite shoulder and head of the stillborn fetus. The child was macerated and measured 14 inches in length. There was no hemorrhage, the placenta was expressed by the Crede method, and the recovery was uneventful.

CASE II.—Mrs. T., para-iv, about seven and one-half months pregnant, was admitted to the Harlem Hospital on November 28, 1913, at 4.45 A. M. with the diagnosis of breech presentation. Six hours later when I first saw the patient, the cervix was almost com-

pletely dilated, with presentation of the left shoulder, the left arm lying in the vagina, the pains were very strong, soon the shoulder appeared at the outlet with the left chest, followed by the doubled up trunk and lower limbs, the opposite shoulder and the head following immediately after. The female child weighed 4 1/2 pounds and was stillborn. The patient made an uneventful recovery.

CASE III.—Mrs. T., para-ii, admitted to the Harlem Hospital on Jan. 19, 1914, at noon, the cervix admitting three fingers, the presentation L. O. A. The membranes ruptured at 8.20 P. M., and at 10 P. M. a macerated male child weighing 5 pounds and 10 ounces was born by the same mechanism noted in the two previous cases. The puerperium was uneventful.

144 WEST FIFTY-EIGHTH STREET.

POSTTYPHOID SUPPURATION OF AN OVARIAN CYST INFECTED BY THE BACILLUS TYPHOSUS OF EBERTH.

BY

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THE occurrence of suppuration in the contents of an ovarian cyst is a well-known, if somewhat infrequent, complication. Pfanenstiel, in Veit's Handbook of Gynecology, states that it occurs in 3.6 per cent. of the cases.

With the disappearance of tapping as a clinical procedure, the Fallopian tube and intestine are, without doubt, the principal sources of infection. To these must be added the appendix and circulation, the latter especially in general systematic infections.

The bacterium coli and the pyogenic cocci are the microorganisms most commonly found in the pus of these cysts.

Infection with the typhoid bacillus, which concerns us more especially in this paper, must necessarily be a rare condition, since it requires the occurrence of typhoid fever in a patient already possessing an ovarian cyst.

CASE I.—Mrs. H., aged thirty-seven, married nine years, never pregnant. Her menstruation, which was always regular, if we exclude the two months she was ill, appears every twenty-eight days, is of four days' duration, and is scanty and painless. The last period was on the twenty-fourth of December, 1913.

With the exception of the ordinary diseases of childhood, the pa-

tient was always well up to the time of her admission into Philadelphia Hospital, September 3, 1913, from which institution she was discharged September 8, after having had a typical attack of typhoid fever.

On December 8, she appeared at St. Joseph's Hospital suffering from an abdominal enlargement and pain. The former presented all the characteristics of an ovarian cyst, involving the lower half of the abdomen up to within 3 cm. of the umbilicus. The enlargement was first observed by the patient about the middle of November, since which time it has grown rapidly. The pain preceded the appearance of the tumor by four or five weeks.

Although a diagnosis of an infected cystoma of the right ovary was made, the patient refused operation until after the holidays.

She returned for operation on January 2, 1914. During the intervening twenty-four days, the cyst had grown so rapidly that it now extended 5 cm. above the umbilicus, while the pain had become constant and much more severe.

At the operation, January 6, 1914, incision of the abdominal wall showed the anterior parietal peritoneum and subjacent tissue to be enormously thickened, edematous, and filled with multiple pockets of pus. The wall of the neoplasm, which was a cystoma of the right ovary, was almost inseparably adherent to the infected anterior abdominal wall. Less dense adhesions also existed between the cyst and the omentum and intestines. During its removal, the peritoneal cavity was soiled by a small quantity of its contents.

The cyst contained seventeen hundred and ninety (1790) c.c. of a uniformly greenish-yellow purulent fluid, that was free of odor. The pus in the mural abscesses was of a similar character.

On closure, on account of the infected condition of the abdominal wall, a cigarette drain was placed in the lower angle of the incision. This was removed on the fifth day.

The patient made an uneventful recovery.

The cyst wall was a half of a cm. thick, and its internal surface was rough and apparently devoid of an epithelial lining; microscopically it consisted of two layers, an outer fibrous, and an inner necrotic. Epithelial elements were absent.

Examination of the pus, and the employment of the following laboratory tests, demonstrated a pure culture of the *Bacillus typhosus* of Eberth

REPORT OF EXAMINATION OF CYSTIC FLUID.

Received January 8, 1914. Mrs. H., Gyn. No. 1.

Media Inoculated.	Result.
	After 24 hours.
	After 48 hours.
I. Bouillon (plain).....	I. Growth turbid, watered silk appearance.
II. Bouillon (glucose).....	II.
III. Dubanis peptone.....	III. Growth, similar to I.
IV. Potato.....	IV. Growth, slimy "invisible."
V. Gelatine (plain).....	V. Minute colonies with pellicle.
VI. Litmus milk.....	VI. Slight change to acid.
VII. Agaragar.....	VII. Growth, slight moist.

(a) A drop culture obtained from I. above gave a very positive typhoid result, the bacilli in time becoming immobile and clumped. Previous to the drop culture a smear was made from the potato growth, and the result was so suspicious of bacillus typhosus that the former (a) was resorted to with success.

W. C. S.

It had been clinically recognized for a long time that suppuration of an ovarian cyst occasionally follows an attack of typhoid fever. Walzberg, in 1888, and Kümmel, in 1890, each reported a case of this kind.

Werth, in 1893, was the first to demonstrate, by bacteriological examination, that the pus producer in his case was the *Bacillus typhosus*.

Since his report twenty cases of similar character have appeared in print. Although the clinical history and the bacteriologic examinations would stamp most of these cases as pure typhoid infections, it was not until the discovery of the scientific agglutinins, that the *Bacillus typhosus* of Eberth could be identified with certainty, and could be differentiated from the bacterium coli groups and paratyphoid bacilli.

Wallgren, in 1899, first applied the serodiagnostic tests in this class of cases. From that time on to the present, the majority of cases recorded have employed the various culture media and agglutination tests necessary to make a positive diagnosis of a pure typhoid bacillus infection.

In former years, the necessity for this was obviously more important than now, as at that time it had not been determined that the *Bacillus typhosus* Eberth possessed pyogenic properties.

Concerning the source and time of infection in typhoid suppurative processes, it has been shown by Coleman and Buxton in their studies of the blood in typhoid fever, that the typhoid bacillus is present in the blood of all patients suffering from typhoid fever; that multiplication of the bacilli does not take place in the alimentary canal, but in the lymphopoietic organs; and that convalescence follows within a few days of the disappearance of the bacilli from the blood.

We may assume from these conclusions, that unlike most other infections of an ovarian cyst, the blood is the carrier of this infection, and furthermore, that the infection must take place during the bacilemia of the acute stage of the disease, although local manifestations of suppuration may be delayed until months after the disappearance of the fever. In cases published by Werth and Zatschenko, eight months elapsed before the symptoms necessitated operative interference.

As an example of the remarkable vitality of the *Bacillus typhosus*, Bland-Sutton reports a case in which the typhoid bacillus of Eberth was found in the pus of an ovarian dermoid sixteen years after an attack of typhoid fever.

A conclusion which would be very difficult to accept a few years ago, but now it is definitely established by the observations made in typhoid carriers, that the typhoid bacillus may live as a saprophyte in the gall-bladder for many years, and that when passed out is capable, in a new host, of inducing the disease. Dean reports a case in which typhoid bacilli were harbored in the gall-bladder for twenty-nine years, and Dermoiser, in a paper on posttyphoid suppuration of the tubes and ovaries, quotes a case of a girl, who had an attack of typhoid fever at eighteen years of age, and was operated upon ten years later for a tubal tumor, in the pus of which the *Bacillus typhosus* was found.

As a rule, however, suppuration followed in the majority of cases within a few months of convalescence. In two cases, reported by LeConte and Lewis, in 1902, it occurred in the fourth and fifth week of the disease, respectively. As Taylor pointed out, these cases were also of interest in demonstrating the value of the blood count in preventing confusion in the diagnosis between typhoid fever, the septic condition, and the reverse. Following the subsidence of the typhoid symptoms, there was a secondary rise of temperature, etc., and coincidentally the leukopenia rose to a leukocytosis of 9200 in one, and 10,400 in the other. With incision and drainage of the cyst contents, the septic symptoms and increased number of leukocytes disappeared. Five days later, both patients had a relapse of

the typhoid symptoms, without, however, any increase in the number of white blood cells.

In reviewing the cases recorded, one of the points of interest was the frequent occurrence of dermoids. Eleven of the eighteen cysts removed were of this variety. An unusually high percentage when we consider that, according to Olshausen, only 3 1/2 per cent. of all ovarian cysts are of this type, although Wunderli, in a study of twenty-four suppurating cysts of the ovary, found one-third were of this class. Pfanenstiel also mentions the proneness of this tumor to degenerate, which he ascribes to its slower growth and longer retention in the pelvis.

As the fluid contents of a dermoid affords no better culture medium than the pseudomucinous or seroalbuminous cysts, it is quite possible that its more solid elements, bone and cartilage, do, and it had occurred to the writer that this may be the explanation of the more frequent infections of these neoplasms, especially as we know that the *Bacillus typhosus* most commonly localizes itself and produces suppurative processes in the periosteum of the long bones and joints.

Pain and rapid growth of the cyst were the prominent symptoms in all of the cases. Some were accompanied by fever, and in a few mild septic disturbances.

At the operations, adhesions existed between the cyst wall and intestine, omentum, and especially the anterior abdominal wall in the majority of cases. In a few instances the tumors were free, and in the cases of Lewis, Gans, and Bland-Sutton, they were so dense that the cyst wall could not be removed, or only in part.

A fact of greater importance is the innocuousness of pus-containing typhoid bacilli in the presence of wound and peritoneal contamination. In the eighteen cases operated upon by abdominal section, eight cysts ruptured during their removal with consequent pollution of the peritoneal cavity and the wound. Of these eight, two only were drained, Lewis' case, who left in part of the cyst wall, and my own, the latter on account of the extensive infection with multiple abscesses in the abdominal wall.

In two others, the recovery was complicated by infection of the wounds. They were the cases of Sudeck and Walker. Both had been closed without drainage. The pus in Sudeck's mural abscess showed a mixed infection of staphylococci and typhoid bacilli; in Walker's, no bacteriologic report was given. All the operated cases recovered.

The only mortality in the list of the twenty-one cases was the

patient of Bensis', who died suddenly of heart paralysis following the removal, by trocar, of six liters of pus.

In view of these results it may be deduced that drainage is unnecessary in operations for the removal of cysts infected by the typhoid bacillus, in which the peritoneum and wound have been soiled. Unlike contamination by ordinary pyogenic microorganisms, the occurrence of secondary infection appears quite improbable.

LITERATURE AND REFERENCES.

- Walsberg. *Berlin klin. Wochenschr.*, 1888, p. 1008.
 Kümmel. *Centralblatt f. Gyn.*, 1890, p. 81.
 Werth. "Ueber posttyphöse Eiterung in Ovarial Kysten," *Deutsche med. Wochenschr.*, 1893, No. 21, p. 489.
 Schiperowitch. *Frommel's Beiträge*, 1904.
 Sudeck. "Ueber posttyphöse Eiterungen einer Ovarial Kyste," *Münchener med. Wochenschr.*, 1896, No. 21, p. 498.
 Pitha. "Kasuistische Beiträge zur posttyphösen Eiterungen in Ovarial Kysten," *Centralblatt f. Gyn.*, 1897, No. 37, p. 1109.
 Wallgren. "Ein Fall von Typhus Infection einer Ovarial Cyste," *Arch. f. Gyn.*, 1899, Bd. lxi, p. 15.
 Engleman. "Ein Beitrag zu den Nachweisen von Typhus Bacillen in Vereiterter Ovarial Cysten." *Centralblatt f. Gyn.*, 1901, No. 23, p. 633.
 Walker. "Infection of an Ovarian Cyst during Typhoid Fever," *American Practitioner and News*, 1902, vol. xxxiii, p. 420.
 Lewis and LeConte. "Infection of an Ovarian Cyst during Typhoid Fever; Report of Two Cases; Operation, Relapse, and Recovery," *American Journal Medical Sciences*, Philadelphia and New York, 1902, cxxiv, pp. 590 and 603.
 Zatschenko. "P. W. Beiträge zur Frage der Abdominal-Typhosen Suppuration der Ovarial Cysten," *Monatschr. f. Geb. u. Gyn.*, Bd. 19, p. 67.
 Dermoiser. "Ueber Eitrige Adnex-erkrankungen in Folge von Typhus Abdominalis," *Zentralblatt f. Gyn.*, 1904, xxviii, p. 1171-1181.
 Bensis. "Eiterungen einer Ovarial Cyste, Hervorgerufen durch den Ebert'schen Bacillus," *Orient Med.*, 1906, Feb. and March.
 Wunderli. *Semaine Med.*, Sept. 21, 1904.
 Gans. "Typhus-Vereiterung des Ovarial Tumors," *Monatschr. f. Gyn.*, Berlin, 1908, xxviii, pp. 163-167.
 Taylor, F. E. *Journal of Obs. and Gyn. of the British Empire*, 1907, p. 367.
 Bland-Sutton. *Universal Med. Record*, London, 1913, iii, pp. 381-390.
 Vignard, E. "Suppuration d'un Kyste de l'ovaire a la suite d'une Fievre typhoide guerison apres intervention; l'examin bacteri-

ologique du pus decelé le bacille d'Eberth pur," *Gaz. med. de Nantes*, 1905, xxiii, pp. 641-646.

Vignard, E. "Kyste Dermoide chez une typhique—ablation—guérison," *Gaz. med. de Nantes*, 1911, xxix, pp. 161-181.

Maldaigne, L. "Bacilles d'Eberth, dans in kyste de l'ovaire apres la guérison d'une fièvre typhoïde," *Centralblatt für Bacteriologie, I. Abt.*, Jena, 1905, xxxviii, pp. 249-253.

Widal and Ravant. "*Bull. et mem. de la Soc. Med. des Hopitaux de Paris*," Jan. 30, 1902, p. 45.

Krivski. "Typhoid Suppuration of a Dermoid Cyst of the Ovary," *Khirurg. Arkh. Velyaminora*, St. Petersburg, 1911, xxvii, pp. 962-966.

Coleman and Buxton. *American Journal of Med. Soc.*, 1907, vol. cxxxiii, p. 896.

His and Zinser. "Text-book of Bacteriology."

Pfanenstiel J. "Die Erkrankungen der Ovarien," *Veits' Handbuch der Gyn.*, 1908.

Keen. "Surgical Complications of Typhoid Fever," Philadelphia.

Olshausen. "Krankheiten der Ovarien."

2035 CHESTNUT STREET.

PREGNANCY COMPLICATED BY TYPHOID FEVER WITH HEMORRHAGE AND RELAPSE; DELIVERY AT TERM; REPORT OF THE BACTERIOLOGICAL AND SERO- LOGICAL FINDINGS IN MOTHER AND CHILD.*

BY

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(With one chart.)

IN typhoid fever of pregnancy the prognosis for the fetus is grave, since in more than two-thirds of the cases abortion, miscarriage, or premature delivery(1) are caused by the toxemia(2) transmitted from the mother or by the pyrexia acting as an insolation on the fetus.(3) These two conditions also tend to produce uterine hemorrhage,(4) separation of the placenta, nephritis, and hyaline degeneration of the uterine musculature as well as of the chorionic villi(5). The last-mentioned changes may result in asphyxiation and death of the fetus and the induction of labor.

The typhoid bacillus has been found in the fetal blood(6)(7), especially in the later months of gestation; and a positive Widal has

* Read at the meeting of the section on Obstetrics and Gynecology of the New York Academy of Medicine, February 24, 1914.

also been demonstrated(8)(9)(10). The case I am about to report presented an opportunity for investigating these possibilities, and since it presents a number of noteworthy clinical features, it is deemed worthy of reporting.*

Course of the Typhoid Fever.—Mrs. A. Y., age thirty-one years, a native of Austria, para-iii, was admitted to Beth Israel Hospital on July 4, 1912. She had measles during childhood but no other illness. Her habits were good.

Present Illness.—Five days before admission the patient had complained of constipation and fever. The fever continued for three days before admission with afternoon exacerbations, accompanied by extreme weakness and prostration, forcing her to bed.

The day before admission she complained of slight frontal and occipital headache. On physical examination the patient appeared well nourished but was greatly prostrated. There was a slight pharyngitis. Sibilant and sonorous râles were audible all over the chest. A systolic murmur which was not transmitted was heard over the pulmonic area and at the apex of the heart. The radial pulse was 110 beats per minute, regular, rythmical, small, soft, but not dicrotic; the vessel wall was not palpable. The abdomen was tympanitic in its upper part; no tenderness, rigidity, or signs of fluid. There was a mass palpable one finger's breadth above the pubis in the median line. The fetal heart sounds were not heard. There were a few roseolæ scattered over the abdomen and back. The vaginal and breast changes of pregnancy were present. There was a slight edema of the right ankle.

Blood examination on July 5, 1912, showed 4,800,000 erythrocyte and no abnormal red cells. The hemoglobin was 90 per cent. Th leucocytes numbered 5500 with 25 per cent. lymphocytes and 7. per cent. polynuclear neutrophiles.

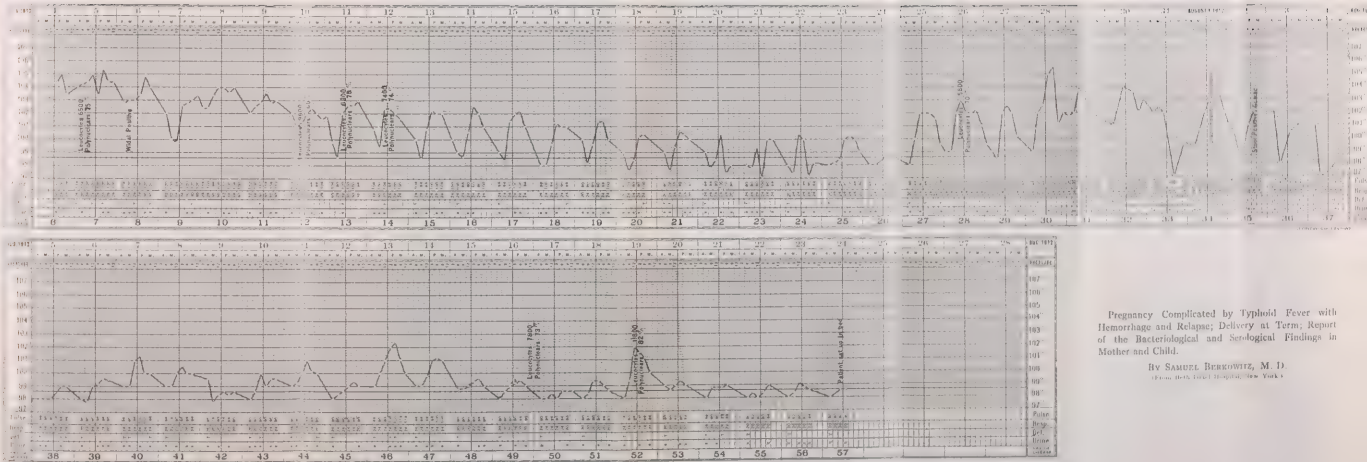
Urinalysis every three days gave: a specific gravity ranging from 1015 to 1025, an acid reaction, traces of albumin only on three occasions, a positive diazo reaction only on one occasion (August 1); repeated microscopic examination showed an occasional hyaline and granular cast (on one examination), but no other abnormality.

The important bedside notes during the course of the illness are as follows:

The temperature was intermittent from July 18 to 24 and on July 25 rose to 102° F. and 103° F., continuing till 28 when it rose to 105.6° F. in the afternoon (see fever chart).

The abdomen was becoming increasingly tender, at first on the left side and then on the right. The stools were carefully watched for blood macroscopically and microscopically and the head of the bed was elevated. New rose spots appeared on the abdomen. The

*For permission to report this case, I owe sincere thanks to Dr. H. F. L. Ziegel and Dr. D. Sheitlis of the Medical Staff and to Dr. S. W. Bandler and Dr. I. C. Rubin of the Gynecological Staff of Beth Israel Hospital.



Pregnancy Complicated by Typhoid Fever with Hemorrhage and Relapse; Delivery at Term; Report of the Bacteriological and Serological Findings in Mother and Child.

By SAMUEL BERKOWITZ, M. D.
(From Beth Israel Hospital, New York)

increased fever, the abdominal signs and the new roseolæ were interpreted as an intercurrent relapse.

August 2. The stool showed blood microscopically and the test for occult blood with guaiac was positive. The pulse and temperature were now recorded every hour. No noteworthy changes were observed.

August 24. The temperature for the past ten days has been below 100° F. The abdominal tenderness has entirely disappeared. The patient was propped up in bed for half an hour at a time. Convalescence was now established and the recovery was uneventful.

September 15. The patient was discharged from the hospital, cured of typhoid fever.

Course of the Pregnancy, Labor and Puerperium.—On admission in July, 1912, the patient said that her last menstrual period was in the latter part of February, 1912; accordingly, she was about five months pregnant. The fundus of the uterus was one finger's breadth above the pubis.

August 22. Forty-eight days after admission the uterine soufflé was distinct on the right side of the abdomen at the level of the umbilicus, but no fetal heart sounds were audible. The patient felt "life" only occasionally.

August 23. The fetal heart sounds were 136 beats per minute and were audible where the uterine soufflé was heard on the previous day.

September 4. The fetal heart sounds were heard on the right side midway between the umbilicus and the anterior superior spine of the ilium. Thereafter the patient felt fetal movements daily.

September 15. The patient was discharged from the hospital, cured of typhoid fever.

October 14. Examination at the hospital showed the fetal heart sounds still audible on the right side. The fetus could readily be mapped out. The head had not yet engaged. Urinalysis was negative for evidences of nephritis. The diazo and the Widal reactions were negative.

November 7, midnight. When the patient was readmitted to Beth Israel Hospital in labor, vaginal examination showed the cervix dilated to four fingers.

November 8, 2 A. M. The birth of a full-term male baby with two coils of cord around the neck was followed in a few minutes by the birth of the placenta. The perineum was intact. Sterile flasks, culture media, etc., were in readiness for cultures, for the collection of blood from the placenta and cord, and for the taking of blood for Widal's from the mother and child. The placenta and cord were afterward sent to the pathological laboratory for microscopical examination.

November 19. The puerperium was uneventful and the patient was able to go home.

Bacteriological and Serological Reports (12).

1. During the course of the typhoid fever.

July 6. Widal positive 1:20 and 1:40.

August 1. Diazo reaction positive.

September 9. Urine and stool negative for typhoid bacilli.

2. During pregnancy after defervescence.

October 14. Widal negative 1:20 and 1:40.

3. During labor.

November 8.

	Blood from placenta	Blood from cord	Mother's finger	Child's toe	Placenta	Cord
Widal 1:20.....			Negative	Negative		
Widal 1:40.....			Negative	Negative		
Blood culture..	Negative	Negative				
Bacteriologi- cal culture.....					Negative	Negative

4. During puerperium.

November 12. Bacteriological examination of the mother's and child's stool and urine was negative for typhoid bacilli.

December 10. Blood from the mother's finger and child's toe was negative for Widal in dilutions of 1:20 and 1:40. A Widal reaction performed on the mother's milk was negative.

Pathological Examination of the Placenta and Cord(11).—Pathological examination of the placenta and cord showed them to be normal.

Observations Subsequent to Discharge.—December 10. When the mother reported at the hospital, the systolic murmur over the apex of the heart and pulmonary area had disappeared.

When every three or four weeks the mother returned to the hospital with the child for observation, both were found to be in excellent general condition. On three of these occasions the Widal performed on the blood of both the mother and child was negative. The mother appeared none the worse after her long illness and was able to do her housework. The child was well nourished, was gaining in weight and had normal stools. The patients were last seen on Feb. 3, 1914.

Summary and Conclusions.—1. In a woman thirty-one years of age typhoid fever developed during the fifth month of pregnancy.

2. The disease was moderately severe and complicated by intestinal hemorrhage and intercurrent relapse.

3. Passing unscathed through the grave dangers of toxemia and pyrexia, the child was normally born at full term.

4. The Widal was positive on the seventh day of the disease. On readmission to the hospital at the time of labor the Widal was negative in the mother as well as in the child immediately after delivery. On several occasions thereafter, when performed on the blood of

both patients, the Widal remained negative. The Widal on the mother's milk was negative. Cultures from the blood of the placenta and cord were negative. Attempts to culture sections of the placenta and cord resulted in no bacterial growth.

Other Reports from the Literature.—According to Foulkrod(5) the severity of the disease is greatly intensified by pregnancy up to the fourth month but mildly so after the sixth month.

Lynch in a comprehensive article on placental transmission(13), concludes that typhoid fever was more often seen in the first half of pregnancy and that it was most liable to interruption in the third month, usually in the second week of the disease. Miscarriage occurred in five out of the six cases recorded; the sixth subsequently gave birth to a living child.

The percentage of cases which terminate before full term varies from 83 per cent.(1) to 58 per cent.(14)(15).

Sacquin(2) describes 169 cases in detail. Of these, only fourteen or 8.4 per cent. went to full term; forty-five of the 169 or 21 per cent. were seven months pregnant, and thirty-one or 69 per cent. of these had premature labors; 124 of the 169 or 73 per cent. were pregnant less than seven months. A little more than half of the 124 had abortions and miscarriages. In the above case the patient continued her pregnancy to full term, with normal delivery and puerperium.

As to the agglutination reaction, in 26 cases occurring in the literature only 8 or 30.6 per cent. were found to give a positive reaction(16). This case showed a negative reaction in the mother and child. The question of the passage of the agglutinins from the mother to the child or their formation in the child is debatable. It is difficult in this case to judge whether the Widal reaction was ever positive in the fetus. Stäubli(17), in experiments with guinea-pigs, shows that the agglutinins may be passively transmitted. He also found that a placenta showing pathological changes could transmit to the fetus the agglutinins whether actively or passively acquired.

According to McCrae(18) the bacillus may pass from the mother to the child in utero, usually in cases of hemorrhagic lesions in the placenta. Preble and Clark(19) collected 19 cases in which the bacillus was isolated from the fetus. In the case recorded the placenta was normal and it is questionable whether the child had the disease.

In the treatment of pregnancy in typhoid fever, the danger to the mother should be considered as the indication for interference. According to Hicks and French(20) premature labor should be induced in the third week of the disease if a viable child is desired.

This period in typhoid fever is perhaps the most dangerous to the mother because of the serious complications that may arise independent of the pregnancy. Kelly(21) states that 56 per cent. of the children are saved. Because of the possibility of hemorrhage and perforation in the above case, induction of premature labor was at one time seriously considered and arrangements made for an emergency which never came. The patient was, however, allowed to continue her pregnancy as though it were uncomplicated by typhoid fever.

It is evident from the foregoing that the prognosis as to life of the mother depends upon the complications and sequelæ of the disease together with those resulting from interference with the pregnancy. Müller(22) notes that 21 per cent. was his maternal death rate. Sacquin(2) gives 16 per cent. and Curschman only 7.8 per cent.(23). The prognosis for the child depends upon the necessity or interruption of the pregnancy and in some instances on the extent of the mental deficiency from the febrile condition as mentioned by Corbin(24).

REFERENCES.

1. Liebermeister. Von Ziemssen's *Encyclopedia Pract. of Med.*, 1875, i, p. 143.
2. Sacquin. De l'influence réciproque de la fièvre typhoïde et de la grossesse. *Thèse*, Nancy, 1885.
3. Runge. Untersuchungen über den Einfluss der gesteigerten Temperatur in der Schwangerschaft auf das Leben der Frucht.
4. Goldammer. *Berlin klin. Wochenschrift*, 1880, No. 16, p. 233.
5. Foulkrod. *AMER. JOUR. OBST.*, liv, 1906, p. 238.
6. Hildebrandt. Zur Kasuistik des placentaren Ueberganges der Typhusbacillen von Mutter auf Kind. *Fortschritte der Medic.*, Bd. vii, No. 23, Dec., 1889.
7. Ernst. Intrauterine Typhusinfektion mit Lebensfähigen Frucht, *Zieglers Beiträge*, 1890, Bd. viii, S. 188.
8. Griffith. Fetal Typhoid Fever and the Widal Reaction, *Med. News*, May 15, 1897, vol. lxx, p. 626.
9. Griffith. Typhoid Fever in Infancy and Childhood, *Phila. Med. Jour.*, Oct. 15, 1898, p. 785.
10. Morse. Fetal and Infantile Typhoid, *Arch. Ped.*, 1900, No. 17, p. 881.
11. Dr. E. Moschcowitz.
12. Dr. J. J. Hertz.
13. *Johns Hopkins Hospital Reports*, 1901-02, x, p. 283.
14. Zuelzer. *Monatschr. v. Geb.*, xxi, p. 419.
15. Vinay: Quoted by Edgar, *Pract. Obstet.*, 1908, p. 256.
16. Quoted by Brickner and Oppenheimer. *N. Y. Med. Jour.*, No. 91, 1910, Feb. 12, p. 327.

17. Experimenteller Beiträge zur Kenntniss der Ausscheidung und der Verebung der Typhus Agglutinine, Innaugural Dissertation, Zurich, 1907.

18. Osler's Modern Med., 1907, ii, p. 70.

19. *Med. and Surg. Repts.*, St. Lukes Hospital, 1905, p. 107.

20. *Lancet*, 1905, i, p. 1495.

21. AMER. JOUR. OBST., 1906, liii, pp. 529, 572.

22. Die Krankheiten des Weibleichen Körpers in ihren Beziehung zu den Geschlechtsfunctionen, Stuttgart, 1888; also *Handbuch der Geburtshilfe*, Bd. ii, S. 930.

23. Typhoid and Typhus Fever, *Amer. Ed.*, 1901, pp. 61 and 199.

24. Influence de la fièvre typhoïde de la mère sur la fetus. *Thèse*, Paris, 1890.

281 EAST BROADWAY.

A SIMPLE METHOD OF TESTING FOR FORMALIN AFTER THE ADMINISTRATION OF UROTROPIN.*

BY

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Chicago.

UROTROPIN was first prepared by Butlerow in 1860 by the direct action of ammonia on formaldehyde gas, and was introduced by Nicolaier in 1895 as a therapeutic agent especially of the genito-urinary system.

During recent years urotropin has become a "cure all" in the treatment of disease especially of the diseases of the mucous membranes. The chief reason for such is the almost universal idea that formalin is liberated by the mucous membranes in large enough quantities to be a bactericidal agent in the destruction of the pathogenic organism.

The U. S. P. gives as an average dose of urotropin 7 $\frac{1}{2}$ grains, which, if given to children, is greatly reduced according to Young's rule. This dose is far from being an average dose, and it can be truly said that there is no average dose of urotropin but the dosage depends on the individual and each individual must be tested.

The test generally used is the Hehner's test recommended by the government for testing for formalin in milk. Milk and the fluid to be tested are mixed together and stratified on sulphuric acid to which a few drops of ferric chloride have been added. If positive a deep violet ring will show at the junction of the fluids. This test is very delicate and shows dilutions up to 1:1,000,000 but does not

* Read before the Chicago Pediatric Society, January 20, 1914.

differentiate between formalin and urotropin. It was due to this test that urotropin became such a universal therapy.

Burnam, in an article published in the *Archives of Internal Medicine* in October, 1912, showed that formalin must be in a solution of at least 1 to 20,000 to have any inhibitory effect on the micro-organism. He devised a test by which a solution of 1 to 20,000 formalin could be detected. This test differentiates between urotropin and free formalin. The test is the addition of three drops of a 0.5 per cent. aqueous solution of phenylhydrazin hydrochlorate plus three drops of a 5 per cent. aqueous solution of sodium nitroprusside plus a drop of a 40 per cent. solution of sodium hydrate which gives an intense blue color if 1 to 20,000 formalin is present, while a green color indicates a weaker solution. He also showed that an average dose of 7 $\frac{1}{2}$ grains of urotropin was much too small.

Dr. Henry, shortly after the appearance of Burnam's paper, began a series of experiments and gave a preliminary report at a meeting of this Society in the fall of 1912. Working in conjunction with Dr. Henry we enlarged our experiments using the material from the Children's Memorial Hospital and the Half Orphan Asylum. We found that each individual must be tested as to the dose required, some of the doses required being over 100 grains daily without any apparent ill effect before we found free *formalin present in the fluids*. These results coincide with those of Talbot and Sisson as published in the *Boston Medical and Surgical Journal*, April, 1913.

In our work we used Burnam's test, supplemented by Hehner's test when the former was negative. In all such cases we got a positive Hehner's test.

Burnam's test is very simple and can be used by any physician in his office, the only objection being that fresh solutions are required every few days on account of their rapid deterioration. I tried various means to simplify the experiment and to obtain a stable reagent. I tried to make the dry reagents into pills, friable tablets and capsules without obtaining a stable product, but finally was able by mixing 1 gram of phenylhydrazin hydrochlorate and 10 grams of sodium nitroprusside in a dry powder and keeping same in an airtight box, to put forth a reagent which can be easily used and will keep for a long time. The reagent I am using at present was mixed ten months ago and is still active. The test is made as follows: a few grains of the powder are shaken on the side of the test-tube, the same immediately shaken then a drop of a saturated solution of sodium hydrate allowed to flow down the tube giving a blue color if formalin is present in a free state of solution of 1 to 20,000.

TRANSACTIONS OF THE NEW YORK OBSTETRICAL SOCIETY.

Meeting of February 10, 1914.

The President, DR. HOWARD C. TAYLOR, in the Chair.

DR. LEROY BROWN presented a specimen of

FOREIGN BODY REMOVED FROM THE URINARY BLADDER.

The foreign body consisted of a piece of slippery elm bark 8 inches long, pointed at one end and one-third of an inch wide at the other. This was introduced into the bladder by the patient in her efforts to induce a miscarriage upon herself and the urethra was mistaken for the uterine os.

The history is as follows: The patient is thirty-two years old, married nine years and has had two children, the last being one year past. Both her labors were instrumental and difficult. She also has had one miscarriage. Her last regular menstruation was October 15, 1913. Feeling that she was pregnant, on November 25 she purchased a slippery elm stick and introduced it as she supposed in to the uterus. The urethra was entered and the stick was allowed to remain over night. Having disappeared the following morning she inferred that it had fallen out. A week following, the vesical symptoms commenced and increased in severity until the patient entered the hospital on January 26, two months after the introduction of this foreign body. The patient, on entering the Woman's Hospital, was passing blood and pus by the urethra with a great deal of vesical tenesmus. The examination of the bladder was unsatisfactory; it, however, showed the presence of a foreign body of considerable size. This was removed through an artificial vesicovaginal fistula three days after entering the hospital.

DISCUSSION.

DR. W. H. W. KNIPE.—“The subject of foreign bodies in the bladder which become incrustrated, brings up several interesting questions. Some years ago I removed an incrustrated bougie out of the bladder of a woman who had been delivered in a maternity hospital two months previously. At that time there was no suspicion of anything wrong in the bladder and the question naturally arose, when was the bougie which was found, introduced? I was of the impression that a bougie which remained for a matter of two or three weeks would probably become incrustrated and I thought that perhaps the patient herself after delivery had introduced the same.

She denied, however, that she had done anything of the kind, nor did she know of anyone else having introduced the same. The case therefore remains a mystery."

DR. LEROY BROWN also reported a case of

LARGE HYDROSALPINX WITH INEFFECTIVE BLADDER EMPTYING BY
CATHETER PRIOR TO OPERATION.

The specimen consisting of the uterus and adnexa was shown on account of two interesting features in connection with this case. The first was the presence of at least 10 ounces of urine in the bladder, though the patient was catheterized a few moments previously; the second was the absolute freedom from adhesions even of the filamentous kind between the adnexa and the surrounding adjacent structures.

The history was as follows: The patient, aged forty-four, a widow, entered the Woman's Hospital complaining of pain in the lower left quadrant of the abdomen, together with intermenstrual flow. For several years she has had frequent attacks of pain in the left inguinal region. For the past few months the pain has been severe, dull in character and almost continuous. The menstrual period has been lengthened during the last year. The examination showed a uterus with multiple fibroids, together with distended tubes on both sides. Operation was done January 29, and as is customary the patient was catheterized while under the anesthetic immediately before the operation. On opening the abdomen a cystic tumor presented itself in front of the uterus. After some minutes of study and investigation the tumor was aspirated and found to consist of very pale highly diluted urine. The patient was then catheterized by a glass catheter in the ordinary way.

Such an occurrence not having taken place in my hands during my surgical experience I report the condition on account of the possibility of its occurring with some one else. I hesitate to offer any explanation. The tubes were largely distended and remarkably free from any vestige of adhesions. The appendix was removed.

The pathological report is as follows:

Specimen.—Uterus with both adnexa and appendix.

Diagnosis.—Myomata uteri, chronic oophoritis; right hydrosalpinx with hemorrhage; hydrosalpinx with tuboovarian cyst.

Microscopical examination: uterus with adnexa, cervix amputated. The shape is distorted by four intra mural myomata, the largest of which is 4 cm. in diameter. These occur on the posterior wall at the fundus. The right appendages consist of a hydrosalpinx with obliteration of the fimbriated extremity and fusion with the ovarian remains; the whole forming a thin-walled sac 6 cm. in diameter. From this the tube goes off in a typical convoluted, retort-shaped manner. On the left side the ovary is distinct but flattened and spread out where the fimbria extremity is fused with it. This also forms a large hydrosalpinx 15 cm. in length. Contents of the right hydrosalpinx have become much darkened through hemorrhage.

Appendix 9 cm. long \times 4 mm. in diameter. Surface smooth, mucosa pale, apparently shows no changes. Lumen patent, contains soft fecal matter.

DISCUSSION.

DR. HERMANN GRAD.—“There are two points to which I would like to call attention. First, there were no adhesions around the hydrosalpinx. As a rule in cases of this kind associated with fibroids, I find on examining the tubes that the isthmic portion of the same presents very little histological change. There is scarcely any infiltration in the mucous membrane. The nearer the uterus the section, the more normal do these tubes appear. For this reason I believe that hydrosalpinx of this kind is not due to any infection which might have come by way of the uterus, and that it must be due to some other pathological condition. This specimen shows on the one side a hematosalpinx and on the other a hydrosalpinx, and moreover the isthmic portion of the tube presents a normal appearance to the naked eye. This demonstrates that in the treatment of these cases, the tube may be tied off during the operation and one need not be afraid of placing the ligatures on pathological tissues. If the tube is tied off a little distance away from the uterus it is as good as a resection, although if one excises the tubes with the stitch that Dr. Dickinson recommends, the procedure is a very simple one.

DR. R. L. DICKINSON.—“I believe that we should know more about the condition of the tubes before we decide on operation in some of these cases. Dr. Cary has suggested the injection into the uterus and tubes of collargol and then subjecting the patient to a radiographic examination in order to determine whether the tubes are patent or not, just as is done in the pelvis of the kidney. I would like to ask those who are expert in this manner of diagnosis whether the suggestion is a feasible one. In the treatment of cases of sterility it is most essential to know whether the tubes are patent or not and thus far we have had no other way to find out except by opening the abdomen and examining the same. Cary injects from 12 to 15 minims of solution into the uterine cavity, the normal capacity of which is about 8 minims. The excess is forced into the tubes and if so, the latter can be demonstrated by x-rays.”

DR. HERMANN GRAD.—“I have tried to demonstrate whenever possible the patency of the tubes by the injection of methylene blue into the uterine cavity but find that it is a very difficult thing to do as the fluid will enter the tube only under great pressure and in many cases the fluid does not enter the tube at all. I believe that the reason for this is the fact that the longitudinal folds in the lumen of the tube act as check valves. There is another way in which I have been testing the patency of the tube lately and that is by placing a small quantity of carmine on the fimbria of the tube. The particles are carried into the uterus by ciliary action and may be found in the vagina in from twenty-four to forty-eight hours later. It is difficult to probe a tube because the lumen of the same at the isthmic portion is exceedingly small and the probe catches in the longitudinal folds.

I am inclined to believe that collargol will enter the tube only under great tension and unless the patient is under an anesthetic it would not be possible to accomplish this."

DR. J. O. POLAK.—"I must take issue with Dr. Grad. If one employs a very fine probe such as the aurists use, no difficulty will be experienced in passing it through the tube. A large experience in the conservative operation in cases of hydrosalpinx leads me to advise salpingostomy in those cases where the probe can be passed through the isthmian and interstitial portions of the tube into the uterus. I have observed four cases in which pregnancy followed salpingostomy and I therefore feel justified in continuing the operation in this type of case where there is no evidence present of uterine fibroids."

DR. C. G. CHILD, JR.—"I would like to endorse what Dr. Polak has said as I have repeatedly probed tubes both normal and obstructed; whereas the fine silver probe referred to generally serves the purpose. I find it easier in many cases to probe with a small filiform bougie upon which the tube is threaded so to speak, rather than to attempt to push the probe through the tube. This is especially the case in long tubes where it is difficult to get a sufficiently flexible probe to go the whole length of the canal. The filiform bougie passes the isthmus and enters the uterus very readily."

The paper of the evening was read by DR. B. P. WATSON of Toronto, Ont., by invitation, entitled

SOME RARE TYPES OF PELVIC TUMORS, PERITHELIOMA OF THE UTERUS,
CANCER OF THE URETHRA, MYXOSARCOMA OF URETHRA AND
BLADDER.*

DISCUSSION.

DR. L. W. STRONG.—"I have been very much impressed with these most interesting cases and with the beautiful photographs which have been shown. In regard to the carcinoma of the urethra, the squamous cell structure would indicate that it came from the external orifice, certainly not from the canal, which is lined with columnar epithelium. I do not know that it would be called urethral, but probably vulvar. In regard to the sarcoma, there have been cases of urethral sarcoma reported. I do not know that there have been any myxosarcomas. There have been myxosarcomata of the bladder, however, and there have been sarcomas of the urethra, of the round-cell type. They are said to have occurred in children and principally, I believe, in females."

DR. HIRAM VINEBERG.—"I desire to refer to a case which I reported several years ago of carcinoma of the urethra starting in the mucous membrane. The growth extended to within a quarter of an inch of the meatus and also to the neck of the bladder in the other direction. There was no involvement of the vaginal wall or the vestibule. The operation consisted in an excision of the urethra down

*For original articles see pages 797-806.

to a point near the neck of the bladder and as a result the patient was incontinent. Later on I performed a plastic operation after which the patient was able to retain her urine for two or three hours. I heard recently that the patient was perfectly well and had had no recurrence. In that instance there was no attempt to remove the inguinal glands. It is the only true case of cancer of the urethra in my experience.

DR. L. W. STRONG.—“Anything that I might say in regard to this remarkable case of perithelioma would certainly be in reference to its classification and I do not know that they would be of any great interest to the gentlemen of this Society. I am sure that Dr. Watson has a very definite idea as to exactly the class of tumor he means by perithelioma, but I think the tendency of the present time is to avoid the use of terms that are indefinite and do not express exactly the origin or meaning of the tumor. Of course there are several possibilities for the origin of this tumor. After looking at the slides, if I were to venture an opinion, I should be inclined to call it angiosarcoma. In reference to perithelioma cells I should like to quote Dr. Mallory of Harvard, because he happens to be the most recent and rational author that I have read on terminology. He says that the perithelial arrangement of cells is only a nutritional characteristic of growth; it may occur in quite a number of conditions, particularly it occurs in carcinoma, and carcinoma of the cervix. It has also been found in carcinoma of the breast. Of course it does occur commonly in angioma and endothelioma. Now, as to the perithelial sheaths of vessels as sources of tumors. They are very indefinite, they have only been demonstrated in the dura and in the cord and in the ear. These are definite perithelial sheaths which might give rise to a neoplasm, which might be termed a perithelioma, but elsewhere in the body they are not definite structures and the term perithelioma is therefore out of place. That cells should group themselves around blood-vessels is only the natural arrangement for nutrition. The term perithelioma has been used to designate an endothelioma with perithelial cells. The diagnosis of endothelioma is probably the most difficult one that the pathologist may be called upon to make. The chances are that the tumor is always something simpler than he has made it out to be. The endothelial cell has no very striking characteristics. It occurs in cell masses without any intercellular substance; and that, perhaps, is the most characteristic feature; but endotheliomata exhibit characteristics which are midway between sarcomata and carcinomata. It is characteristic of lymph-angiosarcomata and hemangiosarcomata to destroy the endothelial lining of vessels. In this instance I notice the endothelial cells are distinct, and there is no apparent transition between the tumor and the endothelium. Dr. Watson doubtless means to use the term perithelioma to designate a tumor with a grouping of the cells around the blood-vessels, and he does not classify it more definitely, whether endothelial or sarcomatous. He would like to preserve the term perithelioma. But I think the modern tendency is to use a term which is a little more descriptive of the underlying character of the neoplasm.”

DR. WATSON in closing the discussion said: "I shall try to answer some of the criticisms that have been made. First of all I think Dr. Strong's criticism is quite right as to the cases of urethral cancer, that in the squamous cell type it is a peri-urethral growth. It cannot be a true urethral growth. We know that cancer in the vestibule is very rare as compared with cancer in the other parts of the vulva, as pointed out by Bonney. That may account to a certain extent for the infrequency with which one meets with primary cancer in the urethra. There have been a good number of cases of sarcoma of the urethra and bladder described but I have not come across a case where the tumor presented so distinctly in the vulvar region and which infiltrated in that way up into the bladder. Dr. Vineberg mentioned his case of cancer which is included in Whitehouse's statistics. These statistics were published just two years ago. It is interesting to hear from him that the inguinal glands were not involved. In most cases the inguinal gland seemed to be involved.

With regard to this term perithelioma I thought I safeguarded myself at the beginning by saying that I did not know what a perithelioma was, and I think in recording these cases we should be very definite in stating just what we mean by it. I suppose it will be only a few more years when these cases will be relegated to their proper group. They are really angiosarcomata. For instance, Adami in his text book classes them with the angiosarcomata but inclines to give them a separate grouping because of this perithelial arrangement. In looking at those cases of course the large areas of necrosis suggest that the growth has been really a much wider one and that the cells round the lumen of the vessels have persisted. All I mean by perithelioma is a growth where there is a distinct perithelial arrangement and which apparently originates in the perivascular lymphatics. It is really an endothelioma of the lymphatics, with a distinct perivascular grouping of the cells."

TRANSACTIONS OF THE OBSTETRICAL SOCIETY OF PHILADELPHIA.

Meeting of February 5, 1914.

The President, GEORGE ERETY SHOEMAKER, M. D., in the Chair.
DR. BROOKE M. ANSPACH read a paper on

EXPERIENCES WITH SPINAL ANESTHESIA IN PELVIC SURGERY.*

DISCUSSION.

DR. CHARLES F. NASSAU.—I have used spinal anesthesia in a few cases; only in a few cases, because I cannot help feeling that there must be postoperative nervous damage in a certain definite number

* For original article see page 753.

of cases. We hear of it, and that patients die occasionally there can be very little doubt. We all saw within the last two or three weeks an account of a death in a hospital in the southern part of the city—a coroner's case—following the injection of stovaine. I believe that what cannot be accomplished with general anesthesia may usually be done with local anesthesia, and that the fear of postoperative pneumonia following a well-conducted etherization is not well grounded. It is well known that in the mere exploration of the abdominal cavity, whether under local or general anesthesia, particularly of the upper abdomen, pneumonia can follow local anesthesia as well as general. I would not feel inclined to judge Dr. Anspach's results because of inability to separate the scopolamine from the spinal anesthesia. To add scopolamine and morphine to another tremendous depressant is to add insult to injury. That patients may die following the hypodermic injection of hyoscine there is very little doubt. Neurologists who use hyoscine more often than the surgeons can confirm this. I have never used scopolamine as an adjunct in spinal anesthesia. One might as well knock the patients on the head. I know of one case living in Frankford whose physician spoke to me to-day of the condition from which she is suffering and which she ascribes to operation under spinal anesthesia for hemorrhoids. She suffers from intense backache and for four years has had uncontrollable headaches and sciatic pain. Before operation she was apparently perfectly well. At least she says she was. If patients develop a pneumonia within twenty-four or thirty-six hours after the administration of ether, I am almost sure that they are going to get well. One hears of serious conditions following spinal anesthesia. I believe there is at least one gentleman present who would be able to tell us of a patient apparently dying from meningitis following spinal anesthesia. Personally I am fond of local anesthesia in selected cases. In infiltration anesthesia I think it is admitted that out of the ordinary things can be done in certain cases. They are elected for that purpose. To-day I operated on a patient, under local anesthesia, believing that she had an ovarian cyst, and did a hysterectomy with comparatively little discomfort to her. That was an extraordinary case and anyone under the circumstances could have done it. Such a patient could not be found again in a long series of cases. I believe there may be danger in spinal anesthesia with which we are as yet unacquainted.

DR. GEORGE M. DORRANCE.—I select my anesthesia for the case; not the case for the anesthesia. The postoperative complications of ether; vomiting, headache, etc., we see quite frequently. In spinal anesthesia I have had very little of these evil effects during the past year. Formerly when using another preparation they were quite common. In a certain percentage of cases, we find headache and backache following both the use of ether and spinal anesthesia. Backache is not more frequent in spinal than after ether. It must not be forgotten that resting on the operating table accounts for a large portion of these. In such cases we should inquire into the history. In one case, I found the patient had been admitted to

the hospital originally for headache. He had been operated upon for another condition and the headache was due to syphilis. The man had been going about saying that the headache was due to the spinal anesthesia.

Each man has a certain drug and dosage which he prefers to use. One should be familiar with the technic and drug before attempting to use spinal anesthesia. There is no doubt that it is easier to operate upon pelvic cases under spinal anesthesia. The intestines can be packed off with ease and they stay where placed. Spinal anesthesia has not given any extra shock. I have had no mortality from spinal anesthesia.

What should be in readiness for emergency when spinal anesthesia is used? The usual hypodermic medication, oxygen, a pulmotor or intratracheal outfit, the operating table should be one that the head and shoulders can be elevated or depressed. The operating room should be quiet, no talking and the patients should not be asked if they feel pain. In the lower abdomen, I use it entirely. I think my patients get a little better surgery with spinal anesthesia than with ether. We ought to be careful not to attribute every untoward result to spinal anesthesia. It is easy to jump at conclusions and the bad results may be due to certain other causes.

DR. D. J. MCCARTHY.—I have been asked to speak of my experience with nervous complications following spinal anesthesia. I have not made routine examinations of large numbers of cases in which spinal anesthesia has been employed. In looking over my records I find that my cases are limited to about six. In all instances the nervous condition supposed to be the result of the spinal anesthesia was purely functional. In one patient with long continued pain in the leg, supposed to be due to bone disease, but in which the condition was mental, it was decided to make a section of the roots supplying the leg. The patient made a perfect recovery. Three or four months later the patient complained of pain not only in the leg operated upon, but in the arm of the same side. Here the disorder was a functional disturbance.

Of course, there can be no question about the possibility of infection and the production of meningitis. Rarely are blood-vessels punctured.

From experimental work with toxic substances in the peripheral nerves and central nervous system I would not expect injurious results to the roots or meninges from the weak dilutions used in spinal anesthesia. On the peripheral nerves strong acid solutions produce an interstitial neuritis. Injections of acids and alkalis produce an irritative reaction in the ependyma when injected into the cerebral ventricles. Such a condition does not obtain in the localized action of the solutions used in spinal anesthesia.

DR. T. H. WEISENBURG.—There are three questions, it seems to me, involved in this matter: (1) Is there a traumatism to the spinal cord from the injection? (2) Is there or not a secondary degeneration of the anterior and posterior roots? (3) Is there a general toxemia or general infection of the whole nervous system? Of course, I am speaking

only of the nervous system. No doubt we occasionally have some traumatism of the spinal cord in spinal puncture by those who are inexperienced. In doing a spinal puncture one important fact must always be taken into consideration, that is, after the entrance of the needle it should not be turned around in different directions, for in this way the cord is injured, whereas, if the needle is immediately removed after its entrance into the spinal canal, even though the cord has been entered no permanent injury need result. I have never seen a report of a permanent injury to the cord.

Regarding degeneration of the anterior and posterior roots, we know that scopolamin acts upon the anterior and posterior roots and not upon the cord. By its action upon the posterior roots we get anesthesia which is mainly general, but occasionally affects only one root. About an hour or two after the injection the disturbance of sensation and motion disappear. Should there be such a thing as secondary degeneration in the anterior and posterior roots there would be immediate paralysis and disturbance of sensation in the limbs, and yet this has never been reported.

As to general infection. Six or seven years ago I saw paralysis of the external rectus. I have not seen such results since.

I do not see why there should be untoward results in spinal anesthesia. We have all seen dire traumatism of the cord, and yet not permanent paralysis. Some years ago when I was connected with the Polyclinic Hospital a man came in who had jumped out of the third-story window. He was a fireman and was totally paralyzed. It was thought that the man had permanent traumatic myelitis. He is now apparently in as good condition as ever.

I have the same views regarding spinal anesthesia that I have regarding the operability of brain tumors, that is, only those who are capable of such work should operate and it should not be attempted by anyone without previous experience. It is only by having had a large number of cases that one can speak of the subject in an authoritative manner, as can Dr. Anspach and Dr. Babcock.

DR. BARTON COOKE HIRST.—This question, I imagine, interests the whole civilized world. We cannot decide it by local experience. In the tour of the American Gynecological Club last summer a year ago I watched with much interest the different plans of anesthesia seen in various clinics. In almost all the clinics of northern continental Europe spinal anesthesia is used, with morphia and scopolamine and often with chloroform or ether. I did not find that in a single clinic were they able to say there had been no disaster. In Vienna, where there is perhaps the largest operative clinic in Europe spinal anesthesia is not used. In this country, in the greatest surgical clinic in America, that of the Mayos at Rochester, nothing but the drop method of ether is used. In perhaps the second greatest clinic in this country, Dr. Crile also avoids spinal anesthesia. Dr. Deaver uses it I believe, occasionally. Dr. Beach who anesthetizes many patients tells me that he has had more than nine thousand general anesthetics without a death. I have used spinal anesthesia occasionally but do not like it. I think that if we really want to

get at the sentiment of this meeting we need only ask how many of us would take spinal anesthesia if operated on, unless it were apparently an absolute necessity. We would find, I believe, that a large majority would refuse. When the Clinical Congress of Surgeons met here I had brought before the meeting an old lady with a large ovarian cyst. Some one in the audience asked me why I did not give that old woman spinal anesthesia. I replied, "If I were to operate upon you, would you let me use spinal anesthesia?" The answer was, "I would not." "Well," I said, "that is the reason I am not going to give it to this patient."

I think a careful study of statistics would show that spinal anesthesia has the highest mortality of any and I know of three cases in which disability has followed in lower extremities; one in which there is incontinence of feces and urine.

DR. W. WAYNE BABCOCK.—The paper and discussion to a large extent presents opinions similar to those which I have formulated regarding spinal anesthesia after considerable experience with the method. As a rule, I believe that I can operate more easily, quickly, with a smaller incision, less wound manipulation and fewer secondary symptoms by using spinal anesthesia than by the usual methods of anesthesia. The matter of comparative danger I think must be a personal one dependent upon our individual limitations and advantages. Those of us who have watched the Mayos must have been impressed with the great safety of ether as employed by them. They do not use deep anesthesia and the active reflexes render a large incision needful for the satisfactory manipulation of the viscera. Were I able to do the work as the Mayos do it I should be fully satisfied with ether. Unfortunately, I have not been able to duplicate that which they do so admirably at Rochester.

In my experience as resident and operator I have seen about eight deaths from ether and nitrous oxide, a mortality somewhat greater than that we have had from spinal anesthesia, and there has been a very much greater postoperative morbidity after ether than after the intradural injection. Adding the experiences of several of my associates, we have collected thirty-five deaths from an estimated aggregation of 15,000 anesthetizations; twenty-seven from ether, four from chloroform and two from nitrous-oxide-oxygen.

During the last ten years spinal anesthesia has taken nearly all of our mortality. Patients admitted to the hospital whom we believed were going to die or those in whom the operation was fraught with great danger have been given spinal anesthesia almost exclusively. Even in operations on the upper extremities, we have employed the method. As a result we have operated upon a number of patients who were moribund. Perhaps that was a mistake, but it has taught us that patients *in extremis*, and patients greatly shocked are not in favorable condition for spinal anesthesia. The use of narcotics also increases the danger of spinal anesthesia. We have now had something over 5000 operations under spinal anesthesia, with ten deaths on the operating-room table and one death two days after operation in which the influence of the analgesia should be considered. Of

these eleven deaths, in only one case is it likely that the patient would have lived had the anesthetic not been given. In four patients referred to us after attempts at etherization in other clinics had produced nearly fatal collapse, the operations were successfully carried out under spinal anesthesia.

As to other untoward effects, we had some years ago a series of abducens palsies, five or six occurring within a year or so. All followed the use of imported solutions of stovaine or tropocaine. There is reason to believe that some of these solutions were contaminated. During the last three years I have used freshly prepared solutions and no ocular palsy has occurred. As to other palsies I have seen only one that was organic and due to the puncture. This was a sciatic neuritis that followed the deliberate injection of a nerve root. Patients with symptoms attributable to spinal anesthesia we try to refer to a competent neurologist. Then the evidence of organic trouble fades away and the evidence of purely functional trouble is shown.

I have been interested in studying the secondary changes that might be attributed to the intradural injection in patients who have only had ether and I find many who complain of headache, pain in the back, weakness of the legs, or other indefinite symptoms not present before the operation.

I would emphasize the point that I consider spinal anesthesia dangerous in marked shock. If given at all I would then give it with a needle tied in a vein so that adrenalized saline solution could be given without delay. With a very weak or nearly moribund patient the same procedure may be desirable, as the delay incident in getting the solution to the heart often means life or death to the patient.

Experiments upon dogs are often misleading. A dog has only about 7 c.c. of cerebrospinal fluid as compared to the 150 to 180 c.c. of cerebrospinal fluid in an adult man. The anatomical differences render experimental comparisons difficult.

Without dissenting from the statement of the last speaker, I would say that I give spinal anesthesia to my patients feeling that under similar conditions I would choose the intradural method for myself. That this view is shared by others is indicated by the number of physicians and nurses who being familiar with the method have selected it for their friends, members of their families and themselves. One of my associates who has personally made the injection over one thousand times has twice selected spinal anesthesia for his wife. Those who have used spinal anesthesia most are those who are most appreciative of its advantages.

DR. GEORGE ERETY SHOEMAKER read a paper on

THE MANAGEMENT OF NECROTIC UTERINE FIBROMATA*

* For original article see page 778.

Meeting of March 5, 1914.

The President, GEORGE ERETY SHOEMAKER, M.D., in the Chair.

DR. JOHN A. MCGLINN read a paper on

THE PREVALENCE OF PUERPERAL SEPSIS IN GYNCOLOGICAL WARDS.*

DR. COLLIN FAULKROD read a paper on

PUERPERAL INFECTION IN PRIVATE PRACTICE.†

DISCUSSION.

DR. FRANKLIN S. NEWELL, Boston.—I have been very much interested in these papers, because this is a subject that is always with us. We have in Boston a clinic of about 2300 out-patients a year taken care of in their homes largely in the slums; and I would take issue with the gentleman who stated that these patients cannot be properly cared for there. We have not over two deaths a year which can be attributed to the surroundings, and many years we go below that. We watch the patients very carefully. The students who have charge of them are under the control of the house officers who are themselves carefully supervised by the out-patient staff. We see much less trouble in the slums than in the hospital where it seems impossible to prevent infection being carried from one patient to another. Statistics of septic infection are absolutely unreliable. No one likes to believe that a case is septic until they have exhausted every other possible condition. It is only when the truth is forced upon them that they will admit it, often too late for treatment to have any effect. I feel that in practice no man has any right to take care of a case unless he is surgically trained. We should discourage the amount of vaginal examining done by the general practitioner. Usually he does not learn very much by this examination, and if we could teach him to make rectal examinations it would be safer for the patients and there would be fewer cases of sepsis.

Autoinfection is comparatively rare. Once in a while there comes into the hospital such a case. In private practice I never let any one touch the patient except myself. The nurse should be allowed to shave the patient, but should only be allowed to cleanse the vulva, etc., under supervision. I have seldom seen a nurse who did not scrub the anus and then go back over the vulva with the same sponge and I therefore prepare my own patients for operation. I never

*For original article see page 783.

†For original article see page 791.

allow a nurse to give a vaginal douche for any cause until such time after delivery that infection is impossible.

In treatment we must make sure that the uterus is empty. Fresh air and food are then the essentials. We have had for three years in the City Hospital, Boston, an open-air ward. Unless the patient has peritonitis before entrance we expect to save her by putting her out of doors, and avoiding meddlesome treatment. If she has general peritonitis before coming to us she has no chance. Out-door air and leaving the inside of the uterus alone are the most important things that can claim our attention.

DR. EDWARD P. DAVIS.—Following the great improvement in the mortality and morbidity from puerperal septic infection resulting from the introduction of obstetric antisepsis and asepsis, there has been a period during which the mortality and morbidity from puerperal septic infection has remained practically unimproved. This has been especially so in private practice. While hospital statistics are available, it is impossible to obtain accurate statistics concerning mortality and morbidity in private cases; but so far as we can judge from the statistics of cities and communities the preceding statement is true.

When we seek a cause for this condition we find it essentially in the fact that obstetric operations of difficulty are undertaken by unskilled practitioners in private houses without competent assistants, and without adequate facilities for antisepsis and asepsis. Through faulty diagnosis, and from lack of appreciation of the gravity of obstetric complications, operations are undertaken for vaginal delivery before dilatation is complete, and sometimes before the presenting part has become engaged. Mortality and morbidity from puerperal septic infection are inevitable as a result of such procedures.

Another cause for failure in improvement has been the fact that while many practitioners admit the value of antisepsis and asepsis, they do not efficiently employ them.

In addition to this circumstance, there remains a small percentage of cases in which autoinfection arises from bacteria within the genital tract before labor begins. While this percentage is a small one, its existence cannot be denied.

We are, I think, entering upon an era of lessened mortality and morbidity from puerperal septic infection, and this improvement will be brought about in two ways:

Especial attention is now given by those who teach to the necessity for thorough examination and accurate diagnosis in obstetric cases. Stress is properly laid upon the diagnosis of engagement, the size of the pelvis, the size of the presenting part, and the recognition of those conditions which indicate that spontaneous labor is probable, or that labor must be difficult or perhaps impossible.

Better diagnosis is causing many difficult cases of labor to be promptly transferred to hospital, where they receive competent attention under good surroundings. The general practitioner is learning that it is more to his advantage to send complicated cases to hospital and obtain good results, than to have poor results in private

houses under his management. Obstetric cases also report earlier in pregnancy to a physician, and thus give a better opportunity for diagnosis and for necessary attention to the general strength.

There will be no great improvement in the mortality and morbidity of private obstetric practice until cases of complicated labor are considered by the profession and by patients as important as ruptured ectopic pregnancy, appendicitis, abdominal tumors, and other serious conditions requiring skilful surgical attention. The fact that more private patients are confined in hospitals than formerly is a distinct advantage and a move in the right direction.

The value of obstetric cases conducted by students in the slums is far less, from the point of instruction, than obstetric cases conducted in maternities by students under the immediate supervision of instructors. Slum obstetric practice is the practice which the student will avoid when he becomes a practitioner, and beyond the demonstration of the mechanism of labor it is valuable only as an example of how things should not be done.

Training in the immediate repair of lacerations occurring during labor, in the most efficient methods of preventing hemorrhage and avoiding exhaustion, must all be of service in lessening the mortality and morbidity from septic infection. The diagnosis and correction of conditions in the pregnant patient, which may predispose to infection after labor, must also be of value.

DR. BARTON COOKE HIRST.—I regret that I missed the privilege of hearing the papers on puerperal sepsis which have just been read. By a curious coincidence, I was delayed by a call to the hospital to see a case of puerperal sepsis on which I was obliged to operate. I think the feeling of those of us who have watched the advent of antiseptis and asepsis is one of disappointment. I remember when I saw the introduction of antiseptis in the University Hospital while a resident there, and read of its application to obstetrics I felt that the whole subject of puerperal infection was solved forever. From my observation of the last twenty-five years I am obliged to admit that in spite of antiseptis and asepsis, probably in spite of any protection that the future may offer, we are seeing and are bound to see cases of infection. For example there are certain autogenous infections that will never be avoided. For instance, I was called to a distant city to see a lady desperately ill with streptococcic infection who had never been examined. We see a number of these cases in hospital patients with a lack of personal cleanliness but this was a lady in good circumstances. I do not think there is anything especially new to be said about the prevention of puerperal sepsis. All are familiar with aseptic technic, and naturally, by the observance of this technic, we are seeing fewer cases of puerperal sepsis than we saw twenty-five years ago. We will, I hope, see fewer cases in the future, but we will never be without them. It is interesting to speculate as to the commonest cause of autogenous infection. I think in the minds of most of us the thought is prominent that coitus in the last four weeks of gestation is one of the commonest causes.

The treatment of puerperal sepsis is too large a subject for dis-

cussion in any one evening. So much has been learned about it in the last eighteen years that it would be a mistake to attempt to discuss it in its entirety. Two factors in treatment ought to be carefully considered: One is the use of healthy human blood serum. With this I have obtained satisfactory results in the last three to five years. From personal experience I would feel that a woman had not been given every chance unless I had used this measure. I would not resort to it in an ordinary case of sepsis, but in a bad case of streptococcic infection I think it is one of the methods of treatment that ought to be carefully considered.

It would be interesting to know the opinion of the members as to the use of antistreptococcic serum. I have used it very extensively. From what the makers of a local product tell me, probably more than anyone in this community, I have been disappointed to note the uncertainty of this remedy. In a small proportion of cases the results are brilliant. I have seen satisfactory results in a fair percentage, and absolute failure in many cases. But there is this to be said: There is no harm in the treatment if it is given correctly. I would not dream of giving it as I have seen some internists give it, a very moderate dose, and then after seven or eight days another moderate dose. I know of one case in which by that plan a fatal anaphylaxis occurred. My plan is to give massive doses for three or four successive days: 320 c.c. in twenty-four hours. This treatment too ought always to be considered in a grave case.

Regarding the operative treatment of puerperal sepsis I have had, I think, a convincing experience in the University Hospital. We have a wing of the hospital set apart for septic cases brought in the ambulance, which is never empty. I feel that the operative treatment of puerperal sepsis is not as fully understood as it might be. There are certain hospitals in which an operation will not be performed for puerperal infection. My head nurse in the University Hospital told me that in a recent visit to New York she had observed an indisposition in hospitals there to resort to operative treatment for puerperal sepsis. In the last three years my mortality in the operative treatment of these cases has been less than 10 per cent. Operation has been done only in cases that would have been fatal without; with localized suppuration in abdomen or pelvis or streptococcic necrosis of the uterus. I think we may say that in a condition in which the mortality has been 100 per cent. a recovery rate of 90 per cent. represents considerable progress.

DR. GEORGE M. BOYD.—I am in hearty accord with the remarks made by the readers of the papers, especially with the practical remarks of Dr. Foulkrod regarding instruction to students upon treatment of obstetrical cases. Puerperal infection in the practice of the men in general work I believe to be due to imperfect hand-cleansing and too early desire for surgical interference. In a paper in regard to the waiting method in the treatment of labor cases, Kerr of Glasgow compared the results of five years operative treatment with those of five years of the waiting method, showing decidedly better results by the latter course. That is about the

course which we follow at the Lying-In Charity. In spite of the fact that we are an old hospital and not quite so up to date in our appliances as we should like, we have had a low maternal mortality.

We all hope to bring about more satisfactory results in puerperal infection, but there are so many conditions involved that we dare not look for immediate results. In private work we must remember that in 36,000 births reported in Philadelphia, 8000 were attended by midwives, who are not very well trained. We must remember also that in many cases the nurse care is imperfect. Bearing in mind the conditions in tenement and in some private work the figures given this evening show a remarkably low death rate and are evidence that we have made very great progress. We do not to-day hear of the epidemics of puerperal infection or of instances such as the celebrated case of a Dr. Rutter who suffering from ozena went about infecting his patients. In a review of a thousand cases treated in the maternity department of the Medico-Chirurgical College Hospital I found five puerperal deaths, but in all of these cases the patient had come into the hospital badly infected. In the last 1000 cases treated there was no death among patients brought in uninfected. In 1248 cases covering three years work in the Lying-In Charity there was one septic death in a clean case brought to the hospital. There were four other deaths but these patients were brought in badly infected. Some years ago I reviewed the work of the Lying-In Charity for the purpose of ascertaining the relation of lacerations to infection, and in 1000 cases, studying the cases in which the temperature reached and remained at 100 during the first week, I found that there were 195 lacerated. There were forty-five cases of infection. An analysis of the forty-five showed thirty-four with history of laceration; eleven without. The result is of interest in showing that 75 per cent. gave a history of laceration. The point, Mr. President, that I should like to make is that we shall still have infection. We have improved very markedly in our hospitals, upon the results obtained outside; and, this in spite of the fact that our hospitals are not as modern as we would like them to be. Because of these conditions we are oftentimes on the anxious seat, but modern equipment demands money that we cannot always obtain. Until we can have a sufficient number of maternities with ideal conditions we must teach our students both by sending them to the patients's home and within the walls of the hospital.

DR. DANIEL LONGAKER.—One very important aspect not touched upon is the medico-legal feature of cases which may have been badly treated. I remember reading about a case of puerperal infection in which suit was successfully brought in England, where the testimony showed that antiseptic precautions had not been taken. It seems to me that the idea of having all cases cared for in hospitals is rather Utopian. There are few of us who did not get our early training among the poor of our city—I know I did, and about the time of that remarkable debate between Fordyce Barker and T. Gaillard Thomas when the former ably but unsuccessfully plead for the specific and epidemic nature of puerperal fever. The theory

received its quietus forever! At this same time the late Albert H. Smith, who was my teacher, was giving teaching of exceptional and very practical value in the prophylaxis of puerperal septic infection. One reason why the men who are graduated now cannot do satisfactory work in private houses is because the responsibility of doing that work is not placed upon them. They are absolutely helpless unless they have a nurse and a hospital and then probably they are not efficient. The only way to train men is to give them responsibility and then they will not be helpless. The important question is where and how to do this. Most of us know the method of treatment of John O. Polak. It was my good fortune to see a number of his cases in the Long Island College Hospital recently and to look over a long list of septic infections treated there. Two surprising things about his cases are that he does practically nothing for them locally; and, that his mortality is surprisingly low. The gravest cases get well. A study of the temperature charts shows that even a vaginal examination sends up the temperature a fraction of a degree. What he does is to force water into patients, place them in the Fowler position, and use the ice bag locally and polyvalent vaccines. He does not employ antistreptococcic serum.

DR. JOHN M. FISHER.—The avoidance of puerperal sepsis in a large proportion of cases depends upon the ability of the obstetrician to make a diagnosis of the presentation and position of the fetus by abdominal palpation, and without the necessity of making a vaginal examination; and, in possessing what we might term a surgical conscience. The same practitioner who may hesitate about doing an operation without the observance of proper asepsis and antisepsis often will not hesitate, in obstetric work, to use gloves that have not been boiled, or to use an apron or drapery about the patient which has not been sterilized. I have found a good deal of sepsis in private practice, in consultation work, and must state that I have never yet been called to see a case where the practitioner was provided with a nail brush aseptically prepared and in the vast majority of cases no brush of any kind is at hand. The man who wants to do obstetric work to-day should be as well prepared as one doing abdominal surgery. He cannot do safe obstetric work unless he has a sterilizer for the proper preparation of gowns and linens. I have an obstetric bag in which I carry my own sterilizer for instruments, etc., and in addition to that, sterile drapery, gown and gloves. If in addition I have a well-trained nurse, I feel that the chances of infection are small. I so often see men professing to be expert obstetricians, who without thinking apparently make an examination with sterile rubber gloves, by passing the gloved finger through an imperfectly prepared vulvar orifice. As stated I believe that practitioners in private practice could do much to prevent infection (1) by a greater accuracy in diagnosis by abdominal palpation, and (2) by the possession, and use of a sterilizer.

DR. GEORGE A. ULRICH.—One thing not touched upon is the necessity of building up our patients that they may resist infection. Why does not each man have a pre-maternity clinic in his own office,

and here look after the patient's blood, build up her resistance, and when he attends her in labor see that he does it in such a way that none of that resistance may be torn down. Most of us know how to keep our hands clean and to prepare the patient. I feel, however, that the patient needs a certain amount of education. She should be informed that she needs the attention of a physician early in pregnancy and during the term, and especially that she should in that time build up blood, nerve and muscle tone which will aid her to fight off infection.

DR. McGLINN (closing).—I cannot well discuss my own paper because it is largely statistical. There are several points, however, in the general discussion which I should like to discuss if I may. In reference to the treatment of cases which have already developed puerperal septicemia, it strikes me that, no matter what method of treatment we are going to adopt we shall have a certain number of deaths. The list of cases in the various hospitals with the number of deaths in each shows that in spite of the various methods of treatment there is a very definite mortality. We all agree upon the necessity of raising the resistance of the patient and upon the removal of any local focus of infection. In some cases perhaps we can best raise the resistance of the patient by the use of human blood serum. I tried it and the patient died. Dr. Polak advocates the use of the polyvalents. Much depends upon the type of case.

Concerning the prevention of the disease—no doubt it cannot be absolutely eliminated. Certain types are due to the midwife; certain types are autogenous, and certain cases develop as the result of the methods of the attending physician. We may well ask ourselves, so far as the attending physician is concerned, who is responsible—the attending physician or the men who taught him? I think in most part it is our own fault. Do we teach our students properly? I believe we ought to teach the men the essentials of aseptic surgery and see that they understand them thoroughly. Dr. Longaker has solved the problem of delivering a patient in the private house. While the facilities are not those of the well-equipped hospital, if a man has the skill and surgical cleanliness engrafted upon him, he ought to be able to do good work in the private house.

DR. FOULKROD (closing).—If I may bring before you an incident—not in any way deprecatory to Dr. Hirst's advocacy of it—of my use of antistreptococcic serum I should like to do so. One night I heard Dr. John Hirst speak enthusiastically of the use of this agent and I decided to try it. A patient was sent in, and while we were obtaining the serum, the woman sat up in bed in the Fowler's position and her temperature came to normal, and she made a good recovery.

The second time I had a chance to try it I gave an injection in the back. There developed an abscess in the back and the patient got well. I remember what Dr. McGlinn said, that a pus infection occurring in the course of a severe puerperal infection, will add to the patient's chance of recovery, that the woman manufactures antibodies more rapidly in her own body and is able to kill the general infection.

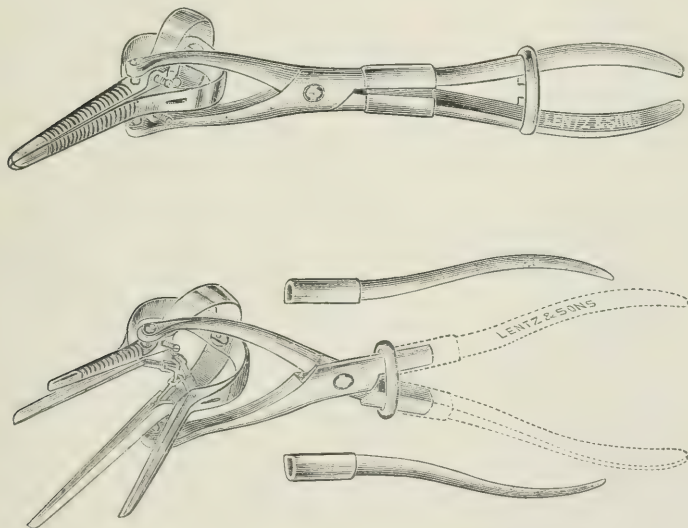
Regarding operative measures, I remember a case brought into the hospital, sent in within forty-eight hours after delivery with a severe infection and the temperature at 104. The uterus had been torn through into the broad ligament and peritoneal cavity. We removed the uterus, drained above and below. The next day the temperature was normal and the patient recovered. If we could operate upon all our streptococcic infections in that stage they would get well, but men will not do it.

DR. F. HURST MAIER reported

A CASE OF OVARIAN CYST INFECTED BY THE TYPHOID BACILLUS.*

DISCUSSION.

DR. BARTON COOKE HIRST presented a Metranoikter.—Those of us who have used the Wylie drain must, I feel quite sure, have had cases of infection from it. I did, in the two years I used it and



those now using it are also having them as I have reason to know for I have coming to my clinic such cases, without the knowledge of the gentlemen who operated, most likely. A couple of weeks ago I opened the abdomen of a woman in whom the Wylie drain had been used two years before. There was a mass present in the interior of one tube almost like a neoplasm, consisting of hypertrophied mucous membrane; both tubes were closed and the use of the Wylie drain for sterility, had made the woman sterile. The only satisfactory substitute I have found for the drain is the metranoikter of Schatz, modified by myself. The model which I

*For original article see page 821.

have is four-bladed instead of two. I have not seen a single case of infection since I have been using it, except in one case of a colored woman in the university clinic, who had gonorrhea which I was unaware of, there developed a rapidly ascending infection and gonorrheal endometritis. I don't think it likely that an implement left in the uterus for twenty-four hours with aseptic technic would cause infection. With the Wylie drain one is bound to have infected tubes in a certain proportion of cases. No one can have a foreign body in the uterus for any length of time and escape it. It is for this reason that the old uterine stem pessary was given up.

While in New York recently reading a paper, Dr. Schaller of Brooklyn spoke of one of his cases, a patient who for nineteen years had been sterile, but in ten months after insertion of the instrument bore a child. Dr. Schaller has devised a new handle which he leaves on the instrument after insertion so that it can be removed a little more conveniently. I slightly modified it further so that it is made detachable on the principle of the old Pryor clamp for vaginal hysterectomy. This modification facilitates the removal of the instrument.

DR. COLLIN FOULKROD.—I should like to ask Dr. Hirst whether his patients have any pain after using this instrument, and whether there is any possibility of necrosis. We used it when it was first suggested and had to discard it on account of the severe pain over night. I should think there might be some danger in treating a virgin with such an instrument.

DR. CHARLES S. BARNES.—Dr. Hirst intimates that this instrument is more efficient than wide dilatation and packing. I should like to ask why in his opinion it is. We feel that the Wylie drain has an advantage because it can be left in for a number of days. I have known of its being left in for a few weeks. I confess that I am afraid to use this instrument with which I have seen some bad results, because of infection.

DR. JOHN M. FISHER.—I have had the privilege of using this instrument in several cases and found in women who have borne children that, as a rule, it is well tolerated. In two cases in women who had not borne children it was necessary to remove it on account of extraordinary pain. I should like to ask Dr. Hirst whether he considers it necessary to do a preliminary dilatation before introducing the instrument.

DR. C. C. NORRIS.—There are cases in which we get dilatation for a time but in which it is difficult to secure permanent dilatation. Pretty hard things are said about the stem pessary. I have used it in about seventy cases. While some infections are inevitable, on the other hand, the results are far better than by any other form of treatment that I personally have ever seen. The two-bladed metra-noikter which I have used I discarded because of the pain produced. This was in nulliparous women with a small uterus and long cervical neck. I believe this instrument gives good dilatation but that it gives more pain than is necessary.

DR. STEPHEN E. TRACY.—I have never used the Wylie drain as I

have always feared complications such as have been described by Dr. Hirst. I have employed the metranoikter many times and a necrosis of the cervical tissues has never been observed. The first patient of whom it was used suffered intense pain. Since then the patients have been given morphia 0.016 gm. hypodermatically before recovering from the anesthetic, and we have heard no complaints of severe pain. Removal of the instrument has given no trouble except in the first case. A finger is hooked over the end of the instrument which is pulled down to the vulva, the handle applied and the metranoikter removed.

DR. HIRST (closing).—I am rather surprised to hear what has been said about pain. I have used this instrument more than five hundred times and have never yet been obliged to remove it on account of pain. We find in the University and Howard hospitals that we do not give morphia in more than 40 per cent. of our cases. I have never seen any injury or necrosis. As to results of treatment, in a series of 160 cases, over 40 per cent. were cured of sterility. We must, however, have a longer series of cases to determine definitely what can be done by our plan. I know, however, of no other mechanical treatment giving better results, and none that is at the same time so efficient and so safe. The Vulliet method I used two or three times but had to give it up. One can get extraordinary dilatation by this method but not with impunity. I feel that before long the Wylie drain will go the way of the old intrauterine stem pessary and be regarded as an anachronism.

Answering Dr. Fisher—I use three different dilators in making primary dilatation in order to get the instrument in—Goodell, Wathen and Cleveland and get a dilatation of 80 mm. The metranoikter is put in up to the handle. If the points are not far enough in there might be pain. It is interesting to be able to state that I have had success with this instrument where others have failed. In a Southern state a patient of thirty-five treated by three of the best known gynecologists of this country without success, in ten months after this instrument was inserted, had a baby. In another case in New York three different operations were done without success. The family was enormously wealthy and one in which it was most desirable to have an heir. In ten months after insertion of the instrument a baby was born. I feel that it is a safe and efficient treatment.

TRANSACTIONS OF THE NEW YORK ACADEMY OF MEDICINE.

SECTION ON OBSTETRICS AND GYNECOLOGY.

Meeting of February 24, 1914.

ASA B. DAVIS, M. D., *in the Chair.*

DR. LOUIS FRIEDMAN reported a case of

TUBERCULOUS PERITONITIS, RESECTION OF BOTH ADNEXA FOR
TUBERCULOSIS FOLLOWED A YEAR LATER BY RESECTION
OF ILEOCECAL JUNCTION FOR TUBERCULOSIS.

Miss B. M., aged eighteen years, was referred on April 25, 1912. Family history negative. Patient had scarlet fever in 1911. Menstruation began when twelve years of age, always regular, last menstruation one week ago. Up to February, 1912, was perfectly well, then she began to have indefinite pains in the abdomen of very mild character, sometimes in the epigastric region but more often in the lower abdomen. Soon after this she noticed that her abdomen was getting larger. She never had any fever, night sweats or cough. Bowels were regular. No loss in weight.

Examination showed a fairly large mass reaching to the umbilicus, rather cystic in character, somewhat hard toward the right iliac region, not movable or tender; fluid wave present.

Vaginal examination showed a fullness in the culdesac, which was somewhat tender, the mass filling the entire pelvis, cystic in character and continuous with the mass in abdomen. Uterus normal. A diagnosis of dermoid cyst was made although a previous diagnosis of pregnancy was made by three other physicians.

Operation April 26, 1912 revealed a very extensive and generally involved tuberculous peritonitis; the cystic mass which was felt in the median line could be traced to the right adnexa and was a thick-walled cyst filled with cheesy material and very intimately adherent to the intestine, so much so that only a portion could be removed without damage to the intestine. Both adnexa were carefully shelled out of dense adhesions and the abdomen closed without drainage. Patient made an excellent and rapid recovery.

About a year later, May 19, 1913 patient again returned to me complaining that during the past six or seven months she had had four attacks of pain in the right iliac region accompanied by nausea

and vomiting. Pain would last from one day to several days. Bowels regular.

Examination showed a freely movable mass, tender on pressure, situated in the right iliac region. Diagnosis: tuberculous cecum and appendix. Operation May 28, 1913. Tumor proved to be cecum; the rest of the abdominal cavity was free from tubercles. Resection of ileocecal junction with side to side anastomosis of ileum to ascending colon was then made.

DR. L. FRIEDMAN also reported the following case:

PYELOGRAPHY AN AID IN THE DIAGNOSIS OF TRAUMATIC INJURY TO THE KIDNEY.

M. A., a girl eleven years of age, while crossing the street was run over by a wagon, sustaining injuries to the back, more so to the left



FIG. 1.—Injury to left kidney as shown by collargol injection.

lumbar region. Examination showed marked tenderness in the left kidney region, moderate rigidity and bloody urine. Diagnosis of injury to the left kidney was made. For the purpose of determining

the nature and the amount of the injury to the kidney, the above method was used to determine whether the capsule of the kidney was involved, so that extravasation of urine into the perirenal space occurred. Under anesthesia, patient was cystoscoped, indigo-carmin injected intravenously and the color found present in the urine from both sides in three minutes. Then the left ureter was catheterized and 25 c.c. of a 15 per cent. solution of collargol carefully injected and the radiograph taken. The picture shows the dissemination of the collargol within the kidney substance, the probability being that only a moderate injury of the kidney substance occurred. No secondary symptoms of urinary extravasation into the perirenal tissues were present and the patient went on to recovery without operation.

Two other pictures were presented which showed the extravasation of the collargol into the perirenal space. On the strength of these findings, both cases were operated and rupture of the kidney found, due to trauma.

DISCUSSION.

DR. A. ERNST GALLANT said that he had seen twenty-two or twenty-three cases of traumatic displacement of the kidney, the symptoms of which very much resembled those described by Dr. Friedman. The treatment was different whether the kidney was ruptured or displaced. In case of dislocation without rupture with its attendant hemorrhage the foot of the bed should be raised. What had been shown about diagnosing by pyelography was very valuable and would enable us to determine whether the kidney was ruptured or otherwise damaged.

DR. ASA B. DAVIS said that Dr. Friedman should be congratulated upon the outcome of his case which he had detected so early in its history.

In the second case the injection of protargol had been postponed. The matter of time was of considerable moment in these cases. It was a great advance if the condition could be determined early and with no uncertainty.

DR. SAMUEL BERKOWITZ presented a report of a case of

PREGNANCY COMPLICATED BY TYPHOID FEVER.*

DISCUSSION.

DR. ASA B. DAVIS recalled three cases of pregnancy complicated by typhoid fever with hemorrhage, two being operated on. They were nearly at term. Toxemia was undoubtedly present and, as in many of these instances, the fetus was very feeble and usually killed by the same. With regard to interference, he believed that the induction of labor, unless absolutely necessary, was a good thing to avoid. The operation was not a simple one and should not be performed unless there were good reasons for so doing because of the added strain on the mother.

* For original article see page 827.

TENIA SAGINATA IN THE APPENDIX.

DR. M. CATURANI presented this specimen, which consisted of an appendix in the lumen of which two living segments of tenia and corresponding eggs were found. The appendix was removed during an operation for a pelvic condition. The patient was an Italian, thirty years of age, who had had four children. Infection followed the last childbirth seven years ago, and a few weeks afterward the patient was subjected to an operation. The left adnexa were removed and probably the abdominal wound drained. As a result of this operation she developed a hernia along the line of the abdominal incision. Dr. Caturani said he operated upon the patient on February 4, 1914, at which time the uterus was freed of adhesions and the right tube, which was occluded, together with a small myoma in the posterior wall, were removed. The uterus was suspended. The appendix, which was retrocecal and covered with adhesions, was removed as a routine procedure. In closing the abdominal incision the fascia was overlapped. The appendix before hardening was relatively long (15 cm.) and showed a wide opening at the base. To the touch something strange could be detected at the lumen, and slight pressure soon brought out what appeared to be a segment of tenia. Another segment easily displaceable was brought toward the apex and out through a small opening made in the wall. The patient reluctantly admitted that she had noticed frequent emissions of segments of tenia in the feces during the past three years. She had suffered from considerable abdominal disturbance but never had had any real appendicular attack.

In a similar case of tenia in the appendix reported by Robb, the patient had been operated upon for tuboovarian abscess, not for appendicitis. It seems that the presence of this worm in the appendix does not affect the organ. Sections from this appendix showed slight chronic inflammation of the structures and lymphoid hyperplasia. The examination of the two segments removed from the appendix, and of many others, showed this specimen to be tenia saginata.

DR. HERMAN GRAD presented the report of a case of

SUSPECTED CARCINOMA OF THE BODY OF THE UTERUS IN A NINETEEN-YEAR-OLD GIRL.

The patient was brought to the Woman's Hospital when eighteen years old and was supposed to have either a polypus or a submucous fibroid. An hysterectomy was performed and there were found large masses of soft material, villous in structure, and very fragile. An ovarian cyst was also removed. For three months after the operation she did not menstruate.

DISCUSSION.

DR. LAWRENCE W. STRONG said that he might well be criticised for the opinions expressed in Dr. Grad's case, if one did not consider that in the case of the curetings he had no means of judging how the

basal glands were acting, that is, whether they were invading the myometrium or not. The appearance of the curetings was that of a destructive adenoma, that is, carcinoma corporis uteri; the cells were in several rows with some grade of optical unrest and mitoses. These things do not in themselves invariably constitute carcinoma, but it is their grade of intensity by which one judges. When, however, the entire uterus was seen it was found that the glands were not invading, or at the most only superficially, much as an adenomyometritis invades. It was found that the basal glands were of a simple type and many had a low columnar epithelium due to their distention into cysts. The whole mucosa was tremendously hyperplastic and villous, and microscopically the picture was that of an adenoma destruens; but the microscopic picture showed the diagnosis must be adenomatoid hyperplasia of the endometrium, which of course is not malignant.

DR. HERMAN GRAD closing the discussion said that the carcinoma might have been due to ovarian irritation. There was no doubt about the patient having had a malignant neoplasm. There was much bleeding and she was losing strength. After the curettage, however, she gained in weight. Of course there was no question regarding the surgical aspect of the case. He believed that the girl would remain well.

VAGINAL FIXATION, INTERPOSITION FOR PROLAPSUS UTERI.

DR. H. J. BOLDT showed the parts of two corpora uteri and the cervixes removed in doing vaginal fixation and said that he had seen several cases during the past few months, in which the operations had not been so satisfactory as the patients were told that they would be. He attributed this to the omission on the part of the surgeons who did the operations to excise a wedge-shaped piece of the body of the uterus, and to do a high amputation of the cervix, thus reducing the size of the organ. Many times a good result would be obtained which, without these measures, could not be procured. Dr. Boldt laid much stress on the necessity of these points in the surgical technic, unless atrophic changes of the uterus had already occurred. The proper repair of the pelvic floor is also very important.

He also presented the pathologist's reports of these two cases, which, from a pathological point of view, verified his position.

No. 1166.—Specimen consists of the cervix uteri which shows a large catarrhal erosion and of a piece of the uterine wall showing the peritoneal covering and the hyperemic mucosa.

Microscopical Examination.—Sections made near the endometrium show a thickened mucosa, the glands of which are hyperplastic and hypertrophied. The interglandular stroma is loose in texture and the seat of interstitial hemorrhage. The capillary blood-vessels are dilated or torn. The myometrium shows hyperplasia of the connective elements chiefly in the intima of the thickened walls of the blood-vessels.

Diagnosis.—Endometritis glandular hyperplastica. Chronic metritis.

No. 960.—Specimen consists of many pieces of tissue said to be uterine scrapings and of a piece of the uterine wall showing the peritoneal covering and the mucosa. Also the cervix uteri which shows a catarrhal erosion.

Microscopical Examination.—First, uterine scrapings. The uterine mucosa is very thickened and its interstitial interglandular elements show very marked hyperplasia. No interstitial hemorrhage present. The uterine glands are slightly increased in number but many of them show marked hypertrophy. Second, the myometrium is very dense in texture and shows very marked hyperplasia of the connective elements while the muscle cells are decreased in number. The blood-vessels are rare and its wall very thickened with new formation of connective tissue in the intima.

Diagnosis.—Chronic metritis. Endometritis hypertrophica and interstitialis.

The steps of the operation, as practised by him, when the uterus is large and the cervix bulky, are: thorough divulsion of the cervix, longitudinal incision of the anterior vaginal wall from just beneath the meatus of the urethra, to the cervical junction of the vagina. Transverse incision of the vagina at its insertion to the vaginal part of the cervix, wide separation of the anterior vaginal wall from the bladder, complete separation of the bladder from the cervix, bringing the body of the uterus well out into the vagina after opening the peritoneum; excision of a sufficiently large piece of the uterine corpus, and closing the wound with two rows of interrupted chromic-gut sutures, sterilization of the patient, if she is still menstruating, by exsecting the uterine cornua and closing these wounds, tying the uterine ends of the tubes, a high amputation of the cervix, and covering the raw surface with the vaginal mucosa, but first placing a ligature on the base of each broad ligament. The bladder is now pushed back into the peritoneal cavity and held out of the way by fastening the fundus of the uterus well forward in the vagina. The sutures for fixing the uterus are now put into position, using interrupted chromic catgut, and then as much of the superfluous vaginal mucosa as necessary is removed. After this has been done the sutures are tied. Sometimes silk is used for two sutures but the gut seems to act just as safely. Finally the pelvic floor is built up by exposing the levator muscles and bringing them together with three interrupted kangaroo tendon sutures, or heavy iodized catgut. The perineum is built up higher than normal, making for the patient a very firm vaginal outlet.

Of course the technic varies with the condition which is present at the time of operation, but that is best determined by the operator.

Dr. Boldt also showed a microphotograph in connection with histological report of a case of chronic metritis. He had the opportunity of seeing lately a larger number in succession than he had seen for some time previously. The condition was variously called metroendometritis, fibrous uteri (this name had been given to it by Professor Montrose A. Pallen about thirty-six years ago) and hyperplasia uteri. From a strictly anatomical point of view, the term

chronic metritis is probably the most nearly correct, but all names represent the same condition from a pathological point of view. The patient from whose uterus this microphotographic picture was made had been bleeding about two years. She was told by two physicians that her uterus required removal. The anatomical picture of this case is so similar that he believed that the one reported will give a good representation of them as a class.

Pathological Report.—Flat, grayish, firm fibrous-like piece of tissue, 3×2 cm. not remarkable in the gross; and a few small soft pieces of pink tissue (curetings) in alcohol.

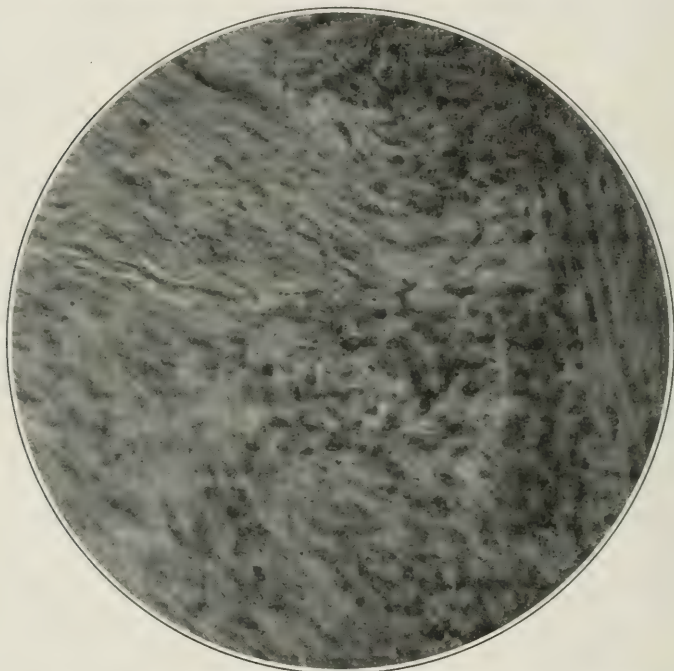


FIG. 1.—Section of uterine wall from a case of chronic metritis, showing typical structure.

Microscopic examination of the curetings shows a mild degree of acute inflammatory reaction (exudation of polynuclear leukocytes, endothelial leukocytes, diffuse fibrin formation and round cells) associated with considerable necrosis of the interglandular stroma. The nuclei of all the tissue take the stain poorly. This condition is probably attributable to previous cauterization of the endometrium. The histological elements of the endometrium that can be definitely studied show no particular pathological change. The glands are only moderately numerous and their epithelial cells are normal in appearance except for the poor staining. There is a good deal of hemorrhage throughout the curetings, most of which is extravasated

and not contained in blood-vessels. There was no evidence of malignancy. Sections of the firm piece of tissue show a fibrous muscular stroma in which the muscular element largely predominates. The vessels throughout this tissue are prominent and many are distended with blood. There is a moderate amount of edema present throughout the tissue. Some of the larger and medium sized blood-vessels show evidence of thickening. The amount of fibrous tissue is undoubtedly increased, particularly about the larger blood-vessels. In none of the sections from this piece is there any evidence of endometrium or cervical epithelium, neither is there anything to suggest a malignant change. The pathological condition present is a moderate fibrosis with arteriosclerotic changes.

It is Dr. Boldt's opinion that such patients can be cured of the metrorrhagia otherwise than by removing the uterus as is so frequently done. The method of using carbolic acid, or chloride of zinc, as described by him on several occasions, will positively cure nineteen out of twenty cases. In this particular case an interior hysterotomy was done, for the purpose of making a digital exploration of the uterine cavity; that is how he managed to get the tissue for the microscopical examination. The patient has not been bleeding for three weeks past, whereas, previously the bleeding was nearly constant.

DR. S. H. GEIST read a paper on

THE CLINICAL SIGNIFICANCE OF SARCOMATOUS CHANGE IN UTERINE FIBROMYOMA.*

DISCUSSION.

DR. W. L. STRONG said that Dr. Geist's paper suggested a number of points of a controversial nature in regard to the histogenesis and classification of these tumors. For instance, Meyer and others would not admit that a sarcoma could arise from a mature muscle cell and would not put weight upon the origin from blood-vessel musculature. In the opinion of many authors, sarcoma is a sarcoma from its very inception, and does not arise from a changed muscle cell but from an embryonal cell of connective-tissue origin. Many tumors have been diagnosed in the past on the basis of tracing gradations from normal cells to tumor cells and not by transformation of normal cells. Nor is a tumor cell of a myoma transformed into a sarcoma cell. The only safe criterion for the diagnosis of sarcoma of the uterus is infiltrative and destructive growth. Mere richness in cells, mitoses and even irregularities in size of cell do not constitute a sarcoma.

DR. HERMAN J. BOLDT referred to the statistics at one of the hospitals he visited where the tumors had been examined over a second time and then a large number of malignant cases had been found when examined microscopically. In a number of instances of supravaginal amputations for supposed myofibroma it was subsequently shown

* For original article see page 766.

that some were malignant. Dr. Boldt had seen ten or twelve cases where a supravaginal amputation had been performed, recurrences followed and the patients died. He recalled one case in particular. A patient was sent to him twenty-five years ago or more. She had a large fibromyoma but was opposed to being operated upon. She was now dying of a malignant change in the tumor. Supravaginal amputation he considered preferable because, as a rule, it left a better roof of the vagina. If there was an eroded cervix or a very bulky vaginal portion, he did a panhysterectomy.

DR. HERMAN GRAD referred to the statistics regarding sarcomatous changes in cases of uterine fibromyoma and called attention to a paper by Dr. Graves of Boston, in which a careful examination of thirty-five cases showed that three had sarcomatous degeneration.

Dr. Grad said his practice was this: If the fibroid was large and palpable and gave pressure symptoms operation was advised. But if the fibroid was small he gave other measures a trial. He had had patients with small tumors who presented no serious symptoms. The supravaginal operation upon these fibroids was a simple operation and gave a low mortality.

DR. S. H. GEIST, closing the discussion, said in answer to Dr. Strong that work by Pick, Williams, and the author in a recent paper, had shown that sarcoma could arise from the pure muscle cells as transitions could be traced and definite histological resemblances found. He also stated in answer to Dr. Boldt's question that the percentage of sarcoma depended upon the classification employed by the pathologist making the histological diagnosis. Many men termed certain tumors cellular myomata which would be called by others sarcomata, and many of these cellular myomata had recurred in the cervical stump after supravaginal hysterectomy. To Dr. Grad's statement that he would first try Röntgen ray and if this did not bring about a beneficial effect then operate, the objection was raised that the effect of α -ray treatment may only be noticed after three to six months and this was a waste of valuable time.

BRIEF OF CURRENT LITERATURE.

OBSTETRICS.

Corpus Luteum Organotherapy in Clinical Practice.—W. T. Dannreuther (*Jour. A. M. A.*, 1914, lxii, 359) believes corpus luteum extracts superior to similar preparations made from entire ovaries. The indications for the administration of a lutean extract are distinct and its use should be limited to these conditions: (1) functional amenorrhea or scanty menstruation; (2) dysmenorrhea of ovarian origin; (3) manifestations of physiologic or artificial menopause, such as nervous or congestive disturbances of reflex origin (hot flashes, psychoneuroses, etc.); (4) "neurasthenic" symptoms during menstrual life; (5) sterility, not due to pyogenic infections or mechanical

obstruction; (6) where the function of one ovary is impaired, or one ovary has been removed, and the compensatory activity of the other is insufficient; (7) repeated abortions, not due to disease or mechanical factors, and (8) hyperemesis in the early months of pregnancy. It is of the utmost importance to use an extract obtained from the ovaries of pregnant animals only. Five-grain doses, three times a day, are usually all that are required. There is great necessity for constant supervision of the blood pressure of patients taking corpus luteum. It should not be permitted to fall more than 15 mm. below the patient's normal pressure, and never below 90 mm. In one of the writer's patients menstruation was reestablished, after apparently complete extirpation of all ovarian tissue, by the use of corpus luteum extract.

Bradycardia of the Puerperal State.—Fabre and Petzetakis (*Bull. de la Soc. d'obst. et de gyn.*, Dec., 1914) give conclusions from observations of bradycardia in women after delivery. This bradycardia is always to be observed after labor, beginning about the third day, the pulse being from 40 to 60 per minute. The bradycardia may be total; a sinus arrhythmia may exist; bradycardia with sinus arrhythmia; or extra systole, only called false bradycardia, may be found. It is probably due to some nervous influence on the pneumogastric nerve. This may occur reflexly, or by toxic action, from the absorption of the products of involution of the uterine muscle or mucous membrane. It approaches the bradycardia of convalescence from acute diseases. Rest in bed seems to have little effect on its occurrence.

Premature Detachment of a Normally Implanted Placenta.—Giorgio Ballerini (*Ann. di Ostet. e gin.*, Jan., 1914) collected 2500 cases of delivery of which 41 suffered from premature separation of the normally implanted placenta. In a few of these cases there were no symptoms and the condition was discovered only when the placenta was examined. In most cases there were symptoms of varying severity. These were internal hemorrhage, sometimes accompanied by symptoms of shock, and finally showing itself externally, when the placenta was so far separated as to allow of its flow between the uterus and membranes. The result to the fetus was always bad, death or premature birth occurring. The results to the mothers were not severe. Pain and swelling of the abdomen were also present in some cases. Gestation is interrupted at from the sixth to the seventh month in most cases. All the labors were spontaneous. If the separation is extensive the normal uterine contractions may not occur. Decidual degenerations caused by inflammation were observed by Biancardi; Hartmann recently found degeneration of the endometrium and musculature of the uterus to account for the separation of the placenta. Treatment consists of rapid emptying of the uterus.

Utility of Artificial Premature Labor.—A. Van Cauwenberghe (*Rev. mens. de gyn., d'obst. et de ped.*, Dec., 1913) discusses the value of premature labor artificially induced. Such procedure introduces into the world a being whose organs are not perfectly developed,

and who is physiologically insufficient, with muscular system undeveloped and circulation and respiration precarious. Still in many diseased conditions this procedure is the only safety of the mother. Deformity of the pelvis may necessitate delivery before the child has reached normal size. Premature labor is here a precious assistance, without great danger for the child or the mother provided that we interfere at the proper time and with the proper technic. To bring up such an infant it is doubly necessary that it should take the breast. The pelvis must be large enough for the physician to await the 34th week of pregnancy. If contraction be so severe that the infant must be delivered before it is viable another intervention becomes desirable.

Modification of the Blood in Anemia from Obstetrical Hemorrhage.—V. Wallich and P. Abrami (*Ann. de gyn. et d'obst.*, Feb., 1914) have made experiemnts in animals, and cite cases in women in which the blood was examined after hemorrhage. There is always an acceleration of the pulse after a severe obstetrical hemorrhage and the amount of acceleration depends on the severity of the hemorrhage. We may make a prognosis of the result of such anemia by considering the condition of the pulse, the arterial tension, and the cytological examination of the blood. If the resistance of the organism is energetic there is inequality of the diameters of the blood cells, sensibility of the red cells to double coloration and presence of granular cells. With a greater reaction there is deformation of the blood cells. In a third degree are seen nucleated red cells. The number of red cells and the amount of hemoglobin measure the blood destruction, while the degree of reaction, marking resistance, determines the prognosis of the anemia.

Prophylaxis and Treatment of Puerperal Phlebitis.—G. Keim (*Jour. de méd. de Paris*, No. 45, 1914) believes that while some cases of puerperal phlebitis are due to infection there are others that do not depend on germs. This form is due to toxic and mechanical causes. This explains the frequency of phlebitis in the puerperal state when there is no other symptom of infection. These cases may arise without any carelessness of the midwife or physician. Uterine antiseptics under the form of douches may be a cause of this sort of phlebitis. We must treat the condition of the intestine during pregnancy, keep the bowels moving, watch for the complete emptying of the uterus after labor, and attempt an anti-coagulation treatment of the blood. The mechanical cause is the retardation of the circulation, and to this is added the increase of coagulability of the blood which normally prevents uterine hemorrhage. The failure of the liver to act normally causes changes in the blood, and there may be severe symptoms of intoxication. There may be intestinal sepsis and intoxication. These cases of phlebitis are more rapid than the infectious, and prognosis is generally good.

GYNECOLOGY AND ABDOMINAL SURGERY.

The Heart in Fibroid Tumors of the Uterus.—The frequent association of cardiac lesions with fibromyomata of the uterus, noted both

clinically and at autopsy, has led to the belief that a causal relation exists between them.

A study by J. A. McGlinn (*Surg., Gyn. and Obst.*, 1914, xviii, 180) is based on the records of 244 autopsies in which fibroid tumors of the uterus were found. He concludes from this that a definite entity of a fibroid heart cannot be sustained. Uterine myomata, occurring in middle and advanced life, are practically always associated with sclerotic heart lesions. These lesions are a part of a general process and bear no relation to the fibroid. Large tumors, by increasing the work of the heart, and tumors, causing pressure on the pelvic circulation may produce hypertrophy and secondary dilatation of the heart. Anemia, from hemorrhages, infections and certain degenerations of the tumor, may affect the heart secondarily, causing changes such as fatty degeneration, brown atrophy, and cloudy swelling. The majority of cases of fatty degeneration, brown atrophy, cloudy swelling, myocarditis, etc., found in connection with fibroid tumors of the uterus are not caused by the tumor, but by conditions entirely foreign to the tumor.

Syphilis in Relation to Uterine Disease.—B. Whitehouse (*Proc. Roy. Soc. Med.*, 1914, vii, 123) urges the importance of recognizing a form of fibrosis of the uterus produced by the virus of syphilis, in other words, the existence of a true syphilitic fibrosis. He emphasizes the necessity of testing by the Wassermann reaction all patients who present the clinical picture of chronic metritis and fibrosis, since this test may provide the only evidence of the syphilitic nature of the affection. The exact proportion which cases of syphilitic fibrosis bear to similar gross changes produced by other factors must at present remain unknown, until a longer series of cases has been investigated. It is possible that some cases of nonmalignant pyometra are also of syphilitic origin, and if no obvious signs of syphilis are present, such patients should be tested by the Wassermann reaction. It is suggested that the menstrual blood be examined for the *Spirocheta pallida*, especially during the secondary stage of syphilis, since the intracellular bodies described by Ross and McDonagh have already been demonstrated.

Tuberculosis of the Breast.—J. B. Deaver (*Amer. Jour. Med. Sci.*, 1914, cxlvii, 157) says that with the few exceptions of direct inoculation of the breast through abraded surfaces of the nipples and skin and possibly through the milk ducts, all mammary tuberculosis is probably a secondary manifestation of the disease. Secondary mammary tuberculosis arises by direct extension from a contiguous area of infection or from blood or lymph vascular metastasis from a distant focus. Since 1904, eighty-nine cases of mammary tuberculosis have been reported, and to these the writer adds five. A total of eighty-seven cases of primary tuberculosis of the breast has been recorded since 1881. No case of mammary tuberculosis in the female has been observed before puberty. The oldest recorded case was in a woman of seventy-three years. The most frequent initial symptom of tuberculous mastitis is a painless lump, as it was in 78 per

cent. of the writer's malignant cases and in 86 per cent. of benign neoplasms. Pain is an infrequent initiative sign, but occurs more often during the course of the disease. It is slight, rarely referred, and is noted especially during the stage of abscess formation and just prior to rupture. Any patient presenting a lump in the breast and complaining of pain in the region of the tumor on respiration should be skiagraphed for osteitis of the underlying ribs. The average duration of the disease in the primary cases was 10.1 months, in the secondary, 11.2 months. The larger number of primary cases occurred in robust women. In the secondary cases also, little mention is made of systemic effect. The presence of fistulas, retraction of the nipple, and enlarged axillary glands strongly suggest tuberculosis mastitis. Tuberculosis of the breast may be classified as: (1) Acute miliary tuberculous mastitis; (2) nodular (discrete, disseminated, confluent) tuberculous mastitis; (3) sclerosing tuberculous mastitis; (4) mastitis tuberculosa obliterans; various atypical forms. Sclerosing tuberculosis of the breast, especially in the absence of areas of degeneration gives, in some cases, all the symptoms of carcinoma. The preoperative diagnosis in these cases is invariably cancer. Frozen section diagnosis of all doubtful tumors should be made at the time of operation. This may prevent unnecessary mutilation in mammary tuberculosis in young women. The writer advises excision of a localized tuberculous mass in the breast of a young woman, with exploration of the axilla in the presence of palpable lymph nodes. In older women simple amputation with excision of the axillary nodes is the method of choice. In either case tuberculin should be given, as it may aid in overcoming any small focus which has escaped the knife.

Surgical Treatment of the Tube and Ovary.—In discussing the surgical treatment of the tube and ovary, C. G. Child (*Jour. Obst. and Gyn. Brit. Emp.*, 1913, xxiv, 287) makes these suggestions: When operating by the abdominal route always remove the pus by aspiration before any extensive separation of adhesions is attempted. This prevents soiling the peritoneal cavity, and, by decreasing the bulk of the tumor, eases up on the adhesions, and adds very materially to the subsequent ease of the operation. Do not use drainage in other than exceptional cases, such as the mixed infections, and where there is a great deal of oozing from raw surfaces, and then always drain per vaginam. Use the transverse incision for greater exposure of the field of operation, with less exposure of the intestines. In closing the abdominal wound avoid the use of absorbable suture material. Better results are to be obtained with nonabsorbable, noninfectable material. Never fail to inspect the condition of the appendix, or at least be sure that it is not in the pelvis.

Anatomo-clinical Diagnosis of the Genito suprarenal Syndrome.—Alfred Gallais (*Rev. de gyn. et de chir. abd.*, Jan., 1914) says that suprarenal lesions generally consist of cellular proliferation, manifested in various ways. There may be (1) hypertrophy, simple or associated with supplementary suprarenals; (2) adenomatous hypertrophy of the cortical substance; (3) benign adenoma; (4)

malignant adenoma; (5) cancerous hypernephroma. Associated with these tumors may be various genital abnormalities. In women the uterus, vagina, and tubes are congenitally small in cases of suprarenal hypertrophy—embryonic in appearance, and in whatever stage of life suprarenal hypertrophy may supervene this condition will be produced. The ovaries are small, fibrous, and of firm consistence, and may contain small cysts. The essential lesions, then, are corticosuprarenal proliferation, and ovarian atrophy. There is a remarkable relation between the function of the genital glands and hypertrophy of the suprarenal cortex. Observations of the testicles are rare and unimportant. These lesions cause a marked perturbation of the equilibrium of the internal secretions. The author has minutely reported and analyzed sixty-seven observations which may be classified thus: suprarenal pseudohermaphroditism, suprarenal virilism, menstrual form, and obstetrical form. In hermaphroditism in the male one finds hypertrichosis, hypersthenia of muscular tissues and nervous powers, deep voice, and virility of character; in women, menstruation, soft voice, adiposity, gynecomastia, and mental feminism. In a child one finds a lumbar tumor; in an adult there are thoracic or lumbar girdle pains and mental troubles, accompanied by a tumor occupying the hemithorax, dull on percussion, descending below the umbilicus. In other cases the tumor is pelvic. The characters of virilism are much developed in a female giving the illusion of male sex by development of the genitals. The secondary sexual characteristics will be masculine. Pubertal changes are marked and begin precociously. Pseudohermaphroditism generally indicates a simple hypertrophy of the suprarenal cortex. In suprarenal virilism the suprarenal tumor develops in an individual without genital anomalies, and the changes are shown in the secondary sexual characteristic. At an early age appear secondary sexual characters of the woman and also those of the man in feminine subjects. First there are amenorrhea; and pelvic pains, nausea and vomiting. Adipose tissue develops, and muscular and nervous hypersthenia; the woman is abnormally strong and believes herself in rugged health. There are nervous and mental symptoms reaching to maniacal agitation: the sexual instinct deviates: the character becomes violent, authoritative, and crises of agony develop, accompanied by vasomotor phenomena. There are increase of hair and pigmentation. A moustache and beard develop and hairs on the pubis and limbs. Pigmentation shows on the forehead, axillæ, back, forearm and hands. This stage lasts some months, and is followed by emaciation and cachexia, thoracic and abdominal girdle pains, asthenia, and appearance of a tumor. The patient becomes melancholy, the achilles and knee reflexes are abolished, the pulse becomes low in pressure, and there is leukocytosis. The disease ends in death in a crisis of cyanosis and asphyxia. In girls from four to eleven years of age we see adiposity, hypertrichosis, and lumbar tumor; menstruation begins before nine years of age. In boys there is premature development of sex characteristics; in man hypersthenia. Adiposity affects the trunk, and not the ex-

tremities; with cyanosis of the extremities. In the muscular type we get Herculean children. In the menstrual form, seen in women from twenty to fifty years old, there may be dysmenorrhea or profuse metrorrhagia, with adiposity, hypertrichosis, and pigmentation. In the obstetrical form the most frequent complication is tubal pregnancy, and sudden death from hemorrhage into the suprarenal is frequent. Differential diagnosis is difficult. The indication is to remove the tumor, but operative results have been bad. Irradiation of the suprarenals has been tried recently. In abortive cases, particularly near the menopause, opotherapy may be of value. Suprarenal, pituitary, or thyroid extract would increase the trouble; ovarian may be of value.

First Results at the Tarnier Clinic of the Atoxic Antigonococcic Vaccine of Nicolle and Blaizot.—Bar and Lequeux (*Bull. de la Soc. d'obst. et de gyn. de Paris*, Dec., 1913) give their experience with the use of antigonococcic vaccines, in one case of ophthalmia and two of salpingitis. An infant with suppurative dacryo-cystitis was injected with 0.5 c.c. of the atoxic vaccine, and in two days the condition was cured completely. Such a case under ordinary remedies would have lasted a long time. Thus we seem to have in this vaccine a heroic method of treatment for ophthalmia neonatorum. Two cases of salpingitis of medium severity were favorably affected and recovered without operation. The observers state that the treatment is without danger; a slight albuminuria and fever only have been observed.

Genital Prolapse.—Jacobs (*Bull de la Soc. Belge de gyn. et d'obst.*, T. xxiv, No. 8) believes that the anatomical studies of E. Martin show that the female genital organs owe their position to a suspensory apparatus, the retinaculum uteri, a ligamentous tissue formed of thick layers of connective tissue, which have direct or indirect connections with the pelvic bones and the cervix uteri. Most authors attach to this tissue but little importance, and attribute to the pelvic floor the principal rôle in suspension. The pelvic floor plays but a secondary part to this retinaculum uteri. It is the aponeurotic, not the muscular layer that is most important. Operations to relieve prolapsus must necessarily be complex, because so many organs are involved. They should have in view the repair of the aponeurotic planes. The author gives details of such operative procedures for correction of cystocele, rectocele, prolapsus uteri, etc.

Cysts of the Cervix Uteri.—C. Dambrin (*Arch. mens. d'obst. et de gyn.*, Jan. 14, 1914) divides cysts of the cervix into cystic tumors (or fibroma and sarcoma) and true cysts, which only he discusses. They are extremely rare. He gives the history of a case observed by him. These cysts are mucous, of inflammatory origin, or embryonal cysts. In the uterus of the female adult there are always present remnants of the canals of Gärtner, groups of epithelial cells with a central cavity, and tissue left from the Wolffian body. These play a large part in the pathogenesis of cysts of the uterus. Mucous cysts develop under the influence of inflammatory condi-

tions, such as chronic cervical metritis. Such cysts may develop from mucous glands, or from embryonic débris. Mucous cysts may be large or small, single or multiple, or causing a true cystic degeneration of the cervix. The author thinks that in most cases embryonic cysts arise from débris of the canals of Gärtner, a few only from Müllerian remains. They consist of a connective tissue layer and an epithelial lining. The character of epithelium varies according to whether it is Gärtnerian or Müllerian. From Gärtnerian débris arises a single layer of cylindrical cells, ciliated or not, and sometimes flattened. In Wolffian débris there is a variety of epithelium, pavement, or polyhedral stratified. An important histological characteristic is a layer of muscular fibers representing the muscular layer of the canal of Gärtner. Pressure symptoms, complicated with infection, rupture, and degeneration may occur. Surgical treatment is advisable.

Substitute for Curettage.—F. Welton (*L. I. Med. Jour.*, 1914, viii, 81) says that the curet is an instrument not capable of doing that which it was originally intended to do, that curettage of the uterus, in the hands of the inexperienced, is a difficult operation, that it is capable of doing more harm than good, and that it is many times employed without reason, has become a habit handed down from a past generation and could be dispensed with as a therapeutic agent. Tincture of iodine is the best substitute for uterine curettage. This is applied by inserting strips of gauze, saturated with tincture of iodine diluted to half-strength, through the dilated cervix. Each strip is left in the canal about a minute. As a rule five to eight strips are used, the last being left in the uterus for 48 hours if a drain is required.

Adenomyoma of the Rectovaginal Septum.—F. S. Cullen (*Jour. A. M. A.*, 1914, lxii, 835) records two cases of adenomyoma of the rectovaginal septum. If adenomyomata of the uterus grow posteriorly, they will spread out into the rectovaginal septum, and become adherent to the rectum; or the peritoneal surface of the cervix may grow fast to the peritoneal surface of the rectum. In either case the rectum becomes fixed to the cervix. In the early stages, the growth may be removed without injury to the rectum. When the growth has invaded the rectum to a limited extent it is necessary to remove only a small portion of the anterior wall of the rectum and the defect can be closed, still leaving a bowel of sufficient caliber. When the rectal involvement is extensive, resection of that portion of the bowel will, as a rule, be necessary. The immediate differentiation between carcinoma of the bowel and adenomyomas of the rectovaginal septum is all-important to the surgeon. If the uterus contains myomas, the probability that the pelvic growth is an adenomyoma is strengthened. Further, if the growth appears to be muscular in origin this diagnosis is still more probable; if the growth is cystic, the diagnosis of adenomyoma is almost certain. Cancer of the rectum starts in the mucous membrane, gradually infiltrates the bowel and then extends to the peritoneum and at a later stage may involve the cervix. Clinically, there is a history of hemorrhage from the bowel.

In adenomyoma of the rectovaginal septum, on the other hand, the only rectal symptom is painful defecation, or there are obstructive symptoms. On rectal examination the bowel mucosa may be found puckered but still intact. Adenomyomas of the rectovaginal septum are benign so far as they do not give rise to metastases, and consequently if the entire growth be removed no further trouble need be feared. If portions be left these will continue to grow and will lead to more pelvic adhesions, and finally produce complications that may result in death or permanent invalidism. When cancer of the rectum is present the operation must of necessity be a much more extensive one. This group of cases still more clearly emphasizes the necessity of a careful microscopic control of all rectal growths, as they might easily pass for rectal carcinomas.

Rhabdomyosarcoma of the Uterus.—E. Glynn and W. B. Bell (*Jour. Obst. and Gyn. Brit. Emp.*, 1914, xxv, 1) have collected fifteen undoubted cases and three probable ones, and have added two cases of their own. The structure of uterine rhabdomyosarcoma is very complex. The transversely striated muscle cells are very few and form only a small portion of the tumor. The term rhabdomyosarcoma is used simply to indicate the presence of a very characteristic type of cell. In addition to muscle cells in various stages of development there are also present small spindle and small round cells, which sometimes form a stroma for the larger muscle cells. Other elements frequently found are: multinucleated cells or sarco blasts, myxomatous tissue, cartilage, and gland tissue. These neoplasms come under the category of mesodermal mixed tumors and probably arise from displacements of embryonic mesodermal tissue from the lumbar region during early fetal life. The persistence of the actual embryonic round-celled tissue may give rise to some of the small round cells so frequently present. The glandular elements occurring in some of the cases are possibly derived from the Müllerian ducts. It seems much more probable, however, that they are persisting uterine glands, and they may under certain circumstances undergo collateral hyperplasia, or even carcinomatous degeneration. Rhabdomyosarcoma of the uterus may occur at any age, the limits recorded being two and one-fourth years and seventy-five years. Hemorrhage and a foul discharge are the chief symptoms of this, as of any other malignant disease of the uterus. The growth is very friable and rapidly breaks down; and is practically always polypoid. When the growth projects into the body of the uterus, hemorrhage is liable to be severe. When it projects into the vagina and arises from the cervix, the growth becomes septic, ulcerates superficially and gives rise to a foul discharge, and in some cases to serious bleeding. Clinically the disease must be distinguished from breaking-down fibromyoma, from carcinoma and pure sarcoma, but correct diagnosis is only possible after histological examination. Rhabdomyosarcoma of the uterus appears to rival chorion-epithelioma in its malignancy, rapid growth and in the speed with which it leads to a fatal issue. In the recorded cases there appear to have been fourteen deaths within a few months of the first symptoms. The longest

period of time any of these cases survived was one year after operation and two and one-half years after the first symptoms. A few of these deaths, however, appear to have occurred as the result of operative procedures.

Treatment of Cancer of the Uterus with Radium.—Jacobs (*Bull. de la Soc. Belge de gyn. et d'obst.*, T. xxiv, No. 8) speaks very enthusiastically of his results in the treatment of uterine cancer with radium. He believes that we should abandon operative procedures in favor of large doses of radium. The author presents a case in which cancer of the cervix was so advanced that the parametrium was affected and the uterus fixed. The cervix and vagina were full of cauliflower growths, and the radium tubes were inserted into the mass because hemorrhage had been so great that the author was afraid of causing death if the growths were first curetted away. The fundus was still normal in size. Five tubes of radium, of 3 cgm. each were inserted and allowed to remain fifty-six hours. The masses became grayish without any hemorrhage. Daily antiseptic injections were given. At the end of three weeks, pain having ceased, the cauliflower growths had all washed away in the douches. The lips of the cervix were thickened, but smooth, red, and bleeding little. Repair went on to complete cicatrization, while the cervix grew smaller, and the edema and infiltration at the neck of the bladder disappeared. Uterine mobility returned and parametrial infiltration passed away. Four months later, at the time of writing, the patient was in good general condition; the vagina and cervix appeared normal. Examination of a piece of the growth showed a lobulated epithelioma of the uterus.

Treatment of Epithelioma of the Cervix with Radium.—Rouffart (*Bull. de la Soc. Belge de gyn. et d'obst.*, T. xxiv, No. 8) presented another case in a patient eighty-two years of age, mother of nine children. Menopause occurred at fifty years. Uterine pain and hemorrhage led to an examination which showed the lips of the cervix swollen, and the canal full of vegetating masses. Radium was at once applied in the cervix for forty-eight hours. The cervix was then brownish, the vegetations contracted, and there was little hemorrhage. Three weeks later another application was made, and six weeks after the first all induration had disappeared and cicatrization was complete. Three months later the cervix appeared normal. Whether cure will be permanent can only be told later.

Cultivation of Human Cancer in Vitro.—F. Maccabruni (*Ann. di ostet. e. gin.*, Jan., 1914) has succeeded in growing human cancer in vitro. Of the epithelial tissues he selected epithelioma because it was nearest to embryonal tissue, which had already been successfully cultivated by others. This gives greater ease and rapidity of growth, as does sarcoma among the connective tissues. He took specimens of inoperable adenocarcinoma uteri, diagnosis confirmed by microscopic examination. From the center of the growth he removed a small fragment, which he placed in Ringer-Locke solution in a thermostat. Other pieces he placed in plasma, and in aqueous

solution of some organs. He found that fluidification occurred too soon with these media. He then tried gravidic plasma because in this the tissues of the embryo grow. In this experiment success crowned his efforts, the tissue proliferating well. The margins became clearer, and certain groups of cells separated themselves from time to time from the main mass. In these were to be seen cells in a state of karyokinesis and even in direct division. The groups of cells increased in number and developed at the periphery, villous processes extending out into the plasma. When fluidification began he added more plasma, or removed the tissue into a new medium. Thus growth was continued. The cells were round or irregular, with central nucleus, having a nuclear membrane and a clear and abundant cytoplasm. The author believes that he has established the possibility of cultivating cancer in plasma, that fluidification may be retarded by using pregnant plasma, and that some of the cells growing cannot be determined precisely as to their nature, while others are distinctly epithelial.

Epithelial Hyperplasia in the Breast.—There are at least 147 different terms which are utilized to express pathological mammary conditions. This confusion has led W. C. MacCarty (*Surg., Gyn. and Obst.*, 1914, xviii, 284) to study the pathology of 1000 breasts. He says that the mammary acinus (gland unit) is composed of one row of columnar or cuboidal epithelial cells, which are the functioning or secretory cells. These rest upon another layer of cells which are almost invisible in the normal breast, but which become prominent when there is a chronic inflammatory reactive process present. These correspond to the so-called "stratum germinativum" of the skin, and are the cells which are the progenitors of the differentiated or secretory cells. They constitute the germinal cells of the epithelium of the breast. In the presence of chronic inflammatory reaction in the mammary, one or more of three histologic pictures are seen, whether the condition be encapsulated or non-encapsulated. When the differentiated cells (inner row) and the undifferentiated cells (outer row) are present, the histologic picture may be spoken of as *primary epithelial hyperplasia*. When the differentiated cells are absent and there remain only the hyperplastic undifferentiated cells of the outer row, the condition may be referred to as *secondary epithelial hyperplasia*. When the line of demarcation between the hyperplastic undifferentiated cells and the stroma is indefinite or absent and the epithelial cells appear in the periacinar stroma, the condition may be spoken of as *tertiary or migratory epithelial hyperplasia*. Primary epithelial hyperplasia represents the usual reaction in chronic mastitis and is not considered to be malignant. Tertiary hyperplasia or migratory hyperplasia is the histologic picture of carcinoma. Secondary hyperplasia is found described as "cyst-adenoma," "Schimmelbusch's disease," "Reclus' disease," "senile parenchymatous hypertrophy," "abnormal involution," etc. It may or may not be malignant, it is placed in a benign group by some authorities and in a malignant group by others. The cells of the epithelium in this condition are often indistinguishable from the cells

in tertiary hyperplasia, a characteristic which arouses a suspicion that the two conditions are intimately related if not a part of the same thing, namely, a malignant hyperplasia. In view of these observations the writer suggests that: 1. The conditions which are associated with classical clinical signs of carcinoma should be treated radically. 2. The doubtful cases in women near or over thirty-five years of age should have the entire mammary gland removed for immediate examination. If primary or secondary hyperplasia be present, nothing more should be done; if tertiary hyperplasia be present, a radical operation should be performed. 3. In doubtful patients near or under thirty-five years of age, a wide section of the mammary gland including the pathological conditions should be removed for examination. If primary hyperplasia be present, nothing more should be done. If secondary hyperplasia be present, the rest of the mammary gland should be removed; and if tertiary hyperplasia be present, the radical operation should be accomplished. This plan avoids incision of tumors. It removes the possibility of unnecessary radical operations and their physical and psychical embarrassment. The removal of the mammary gland preceding an immediate radical operation has not been associated with earlier recurrence that has been found after a primary radical operation.

Diagnosis of Cancer of the Breast.—According to J. E. Jennings (*L. I. Med. Jour.*, Feb., 1914), for the diagnosis of the greater number of cancers of the breast we must rely upon a careful clinical examination, and the elicitation of well-known signs. But there are a considerable number of tumors of the breast in which a diagnosis cannot be made without delay, which is dangerous to the patient. All such suspect masses in women over thirty should be cut down upon, recognized by gross or microscopical examination made at the time and treated as the conditions indicate. Delay is the greatest danger to a woman with a tumor of the breast. It is to be hoped that as women seek advice earlier the number of cases in which a clinical diagnosis of malignancy is possible will diminish and that more cases may be admitted to the group in which the diagnosis is made at the time of operation, 96 per cent. of whom survive.

End Results in Operations for Cancer of the Breast.—Analyzing the results of operations in the Mayo Clinic for ten years, from 1902 to 1912, E. S. Judd and W. E. Sistrunk (*Surg., Gyn. and Obst.*, 1914, xviii, 289) say that results in operations for cancer of the breast are as good as if not better than results in operations for cancer elsewhere. The prognosis in younger people who received the benefit of an early operation was better than expected. The prognosis is variable in a certain per cent. An extensive external involvement may give a fair prognosis, while a slight external lesion may terminate early from internal metastasis. That metastasis may occur many years after the operation, though in the great majority of instances it will appear in the first few years, if at all. The difference between the percentage of patients living more than three to five and ten years is not as great as might be expected; but this is because most patients who die of the disease die within the first three, or at least

the first five years. Living five years without recurrence is an indication of but slight trouble in the future. Comparing these results with those of former years, the results are improving, and the improvement seems due to the fact that patients are coming earlier rather than to any improvement or change in the technic.

Human Ovarian Autografts.—De Rouville (*Arch. mens. d'obst. et de gyn.*, Feb., 1914) gives the results of his observation of nine patients in whom he did autogenous grafting of ovaries. He gives careful histories and sums up the advantages and disadvantages in each case. Unless the graft has been made into the abdominal wall no direct exploration of it can be made, and we can judge of its effects only by the changes in the symptoms of the patient. An exact evidence of the effect of the graft would be the occurrence of pregnancy following the graft in a woman from whom all ovarian tissue had been removed. This has been reported, but the author thinks doubt can be thrown on such cases on account of possible ovarian remains after operation. The removal of the ovary destroys the equilibrium which normally exists among the glands of internal secretion, thyroid, ovaries, and suprarenals. From this result the symptoms of the menopause. The continuance of menstruation, or its appearance where the flow had ceased, would indicate the normal condition of the graft. Among those grafted are cases in which there was observed menstruation that was abnormal, irregular, alternately profuse and scanty, indicating a true ataxia of the internal secretion of the graft. Menopause symptoms are infinitely variable in intensity: some have abundant metrorrhagias undoubtedly caused by the graft. A microscopic examination of the graft is of value. In all the author's cases the impression of the results of the grafting was unfavorable. There was but one favorable result in his nine cases, and that lasted but a short time. The grafts were not capable of permanent function: the patients seemed simply to have a slow deprivation of ovarian functions. Still we should continue these experiments with a view to maintaining as far as possible the normal function of the female economy.

Etiology and Bacteriology of Leukorrhea.—In a study of the etiology and bacteriology of leukorrhea, A. H. Curtis (*Surg. Gyn. and Obst.*, 1914, xviii, 299) says that the uterine cavity tends to remain free from bacteria in cases of leukorrheal infection, but mucous secretion from the cervix may promote the development of purulent discharges. The usual seat of formation of purulent discharges is the lower genital tract. In unmarried woman gonorrheal infection precedes the development of chronic leukorrhea in the majority of instances. A chief part played by the gonococcus consists in preparing the soil for other organisms. The great contingent of leukorrheal bacteria consists of anaërobcs, of which gram-negative bacilli form a large proportion. It is highly probable that these bacteria play an active part in the production and maintenance of leukorrhea. Common aërobic organisms, such as *B. coli* and staphylococci, seem to be of minor importance.

DEPARTMENT OF PEDIATRICS.

TRANSACTIONS OF THE NEW YORK ACADEMY OF MEDICINE.

SECTION ON PEDIATRICS.

Meeting of March 12, 1914.

WILLIAM P. NORTHRUP, M. D., *in the Chair.*

DR. JOHN J. MOORHEAD presented four patients out of a series of eight cases of fracture of the femur treated by the transfixation method. Three of these children had been treated at the Harlem and one at the Post-Graduate Hospital. One of the patients had had a fracture of the femur and of the pelvis; the others had fractures of the femur only. Another of these patients had been treated with Buck's extension with the result that a great deal of soft callous was formed. Under anesthesia this was broken up by an open operation before the transfixation method was applied. This boy showed a little more shortening than the others. The shortening in the other three cases was from one-quarter to one-eighth of an inch. All of the patients had good knee function.

TRANSFIXATION METHOD OF TREATMENT OF FRACTURED FEMUR IN CHILDREN.

DR. JOHN J. MOORHEAD pointed out the limitations of the operative method of treating fractures and of the various extension methods. The various suspension methods might be used with advantage in children up to the age of three years but after that they were not likely to be entirely satisfactory. The series of cases upon which the paper was based consisted of eight children ranging in age from five to fifteen years. In nearly all of them there was no shortening and in many there was lengthening. He had performed his first operation with an ordinary bit and auger. He then devised a steel drill with a detachable cutting point. It was made of 3/16-inch nickel steel. The method of procedure was as follows: The child was anesthetized and the location in the distal portion of the fractured bone chosen for transfixation. The field of transfixation was painted with iodine and the drill was introduced through the soft tissues, the bone and on to the skin of the opposite side. It must not enter

the medullary canal, the joint, the epiphyseal line, or the fracture hematoma. The cutting point was then detached and a simple contrivance attached to either end of the drill to which was attached in turn the cords and weight. This procedure was applicable to fractures of the tibia, the humerus and the femur but seemed particularly adapted to the latter. In fractures of the leg as much as 32 pounds could be applied. This method was applicable to cases in which other methods had failed, to overlapping fractures, comminuted fractures, fractures of the condyle, old fractures and in those where ordinary methods could not be employed. It was preferable to plating because it was a much simpler and less extensive operation, did not necessitate a secondary operation as plating often did, required that the patient be under anesthesia only fifteen minutes, was not painful during convalescence, did not interfere with the comfort of the patient, made nursing a much simpler matter and gave better results in respect to function and deformity.

GUAIACOL POISONING BY ABSORPTION WITH REPORT OF A CASE.

DR. L. A. SEXTON said that as a member of the profession he felt it his duty to call attention to the experience with guaiacol as a local application in the treatment of scarlatinal arthritis at the Willard Parker Hospital.

The value of guaiacol as a local anesthetic had long been recognized, and because of its power to relieve pain it had found its way into the treatment of painful and swollen joints from whatever cause.

Guaiacol was the chief constituent of beechwood tar, being that portion which distilled over between 200° and 205° C. and was subsequently purified, or it might be prepared synthetically from catechol by methylating, or from orthoanisidin by diazotizing and boiling.

Dr. Sexton said the poisoning occurred in a child three years of age admitted to the hospital, February 10, with a moderate case of scarlet fever. The child was well developed and well nourished, and the heart, lungs and kidneys were negative. At the time of admission the temperature was 102 , pulse 140 , and respirations 34 . The temperature gradually came down, reaching normal on the seventh day of the disease, and remained normal until March 4, when the patient developed a cervical adenitis.

On March 10, he developed a severe otalgia for which myringotomy was performed, and this was followed by a profuse purulent discharge from the right ear. On March 12, the urine showed faint traces of albumin and a few granular and epithelial casts. He complained of pain in the right knee, right elbow, and wrist. His other troubles gradually subsided, but the arthritis continued and was very painful, the joints being swollen and tender.

On the morning of March 21 these painful joints were painted with a 50 per cent. solution of guaiacol in glycerin. This mixture had been used previously with no bad results and had seemed in many cases to allay pain. No change was noted in the child's condition

until the following evening when the pulse became rapid and weak, the patient became cyanosed, and vomited all nourishment taken during the night. Large quantities of dark brown urine were voided and it was thought that the child had suddenly developed a severe nephritis engrafted onto the former attack, so he was treated accordingly. The joints were again painted on the following morning with the guaiacol mixture.

At 8.20 on the same morning Dr. Sexton said he made the diagnosis of acute guaiacol poisoning from absorption. The patient was vomiting and very restless, the cyanosis had given place to deadly pallor, which continuously increased, as did also the restlessness. The pulse became imperceptible, the respirations rapid and shallow, the child's face more anxious, the pupils dilated. The child died at 8 P. M., just thirty-four hours after the first application.

The mixture used on the child and also several specimens of the guaiacol were examined by the chemical laboratory and were found to be chemically pure.

The urine smelled strongly of guaiacol and responded to the chemical tests for the same. The color was black; reaction, acid; specific gravity, 1.018; albumin, sugar and indican, negative; blood and hemoglobin, negative chemically and with the spectroscope and microscope.

DR. JOHN WINTERS BRANNAN said that during the reading of the paper the resemblance of this form of poisoning to the condition known as carboluria had suggested itself to him. In carboluria the urine was green. They used to see this when it was the practice to flush out abscesses with strong carbolic; it was due to the excretion of phenol in the urine and seemed to be quite similar to the condition described by Dr. Sexton.

THE PERIL OF DELAY IN THE DIAGNOSIS AND TREATMENT OF INTUSSUSCEPTION IN INFANCY.

DR. EDWARD WADSWORTH PETERSON said that it had taken years of educational effort to place the treatment of appendicitis upon a purely surgical basis. To-day there was general condemnation if a patient with appendicitis was allowed to die without surgical interference. Acute intussusception was far more dangerous to life than appendicitis, and, theoretically at least, belonged exclusively to the surgical field. Experience taught one to recognize the hopelessness of expectant treatment and the relative futility of all aero-hydrostatic measures.

In intussusception the clinical picture was more constant and unvarying and the symptoms more uniform and characteristic than in any other type of intestinal obstruction. In spite of this no class of cases was more often unrecognized and more habitually mismanaged. Because of failure to make a diagnosis or delay in treatment, the mortality in this disease was also disgracefully high. It was unfortunate that hydrostatic pressure and gas or air inflation succeeded in a limited number of cases, for such measures were

often persisted in until the time for a necessary operation had passed. Ladd had collected 216 cases treated by this method with failure in 81 per cent. Clubbe in 173 cases was able to reduce the invagination by enema in but sixteen instances. Leichenstern in a study of 557 cases of intussusception placed the mortality at 73 per cent., and during the first year of life at 88 per cent. Many other authorities gave equally unfavorable results with these methods of treatment. The fault rarely rested with the family in refusing operation but with the physician who failed to realize his responsibility in the care of this peculiarly serious affection. To statistics of greatest interest were those giving the time of treatment, either surgical or otherwise, after the onset of symptoms, and almost invariably one was impressed with the fact that "cured" cases were diagnosed and treated early. Cases recognized and treated during the first twenty-four hours gave a mortality, in experienced hands, of not over 10 per cent. Cases treated after two days had passed, with but few exceptions had but little chance of recovery. Clubbe's work was an inspiration to every pediatric surgeon. Of the 173 cases which he treated, sixteen were successfully reduced by enema. Of the remaining 157 cases operated upon the results were as follows: In the first fifty cases, there were twenty-five deaths and twenty-five recoveries; in the second fifty cases, there were twelve deaths and thirty-eight recoveries, while in the third series of fifty cases, there were four deaths and forty-six recoveries, a mortality of 8 per cent. In the last twenty-five cases treated by laparotomy there was not a single death. The secret of his remarkable success was early diagnosis and prompt surgical treatment. In his last fifty cases the average time from the onset of the symptoms until operation was but seventeen hours. In the majority of cases, after forty-eight hours, the invagination was either irreducible or gangrenous, and resection or enterostomy was required, with either of which procedures the mortality was frightfully high. A search of the literature revealed but eight successful resections in infancy.

In a study of this disease the most striking point was the wide difference between the mortality in the early and the late operations. Probably 70 per cent. of all cases of intussusception occurred during the first year of life.

No other serious surgical affection of the abdomen would be so early recognized. The first examination of the infant generally revealed the condition, and at such a time disinvagination was a simple matter. Generally speaking the child was seized suddenly with severe abdominal pain, more or less pallor, shock, and relaxation. Vomiting usually occurred at this time. Later there was straining and blood and mucus appeared in the stools. With this typical picture there was but one other symptom necessary to determine the diagnosis, namely, the presence of abdominal tumor.

After the first storm of pain was over, there followed a period of calm, during which the infant appeared perfectly well. Later the pain returned and was of an intermittent paroxysmal nature, accompanied by straining, but not by the pallor and shock which ushered

in the initial seizure. If the patient was seen during the calm period, unless the history was carefully considered, the diagnosis was apt to be overlooked. Muco-hemorrhagic stools commenced in from two to twelve hours after the onset of the disease; after the first movement or two the stools contained bile or feces, and flatus was not passed. Vomiting was rarely a prominent symptom until late in the disease; where it occurred early and was persistent, it was significant of strangulation of the blood supply to the bowel. Rarely was it fecal. In every case of intussusception there was present an abdominal tumor, but it was often difficult to palpate. The typical sausage-shaped tumor of the text-books had been too much emphasized. It was rarely felt early and when present meant that the intussusception had progressed to a considerable extent. More often a rounded mass was felt and it might occupy any portion of the abdomen. It was generally quite movable and might resemble an enlarged gland. Where the tumor was oblong or sausage-shaped it was curved with the concavity directed toward the umbilicus. The mass might be felt to relax or contract under the hand. If the tumor could not be felt abdominally, then bimanual rectal examination should be made. Under anesthesia one seldom failed to discover its presence. Later, in addition to obstruction and strangulation, toxemia developed as a result of injury of the bowel wall, particularly the mucosa, and from decomposition of the intestinal fluids. The late picture was that which occurred in every variety of intestinal obstruction. Ileocolitis and the purpuric diseases had occasionally been mistaken for intussusception. In the former there was fever and diarrhea with mucus and blood, and bile, feces, and flatus were passed. No abdominal tumor was present. The purpuric diseases were rare in infancy and hemorrhages elsewhere than from the intestine gave the clue to the diagnosis. It must not be forgotten that intussusception might develop as a complication of these diseases.

The simplest, most successful, and only certain method of treatment in intussusception was early laparotomy with manual reduction of the invagination. Spontaneous reduction had been known to take place and cases had recovered after sloughing of the intussusception. Such results, however, must never be expected or awaited. Like strangulated hernia or fulminating appendicitis it was a condition demanding immediate operative interference. The operation should be performed as quickly as was consistent with safe and thorough work, for infants did not stand prolonged operation well. As three-fourths of the cases originated in the ileocecal region, the incision should be made through the outer margin of the right rectus muscle. Some operators preferred the median incision where the tumor was felt low down on the left side. In relieving the intussusception it was best to commence at the apex of the intussusception and carefully back up to the point where the invagination started. If traction was made on the proximal portion the gut was apt to be torn at the neck of the intussusception. If gangrene had occurred or if reduction was impossible resection and intestinal anastomosis

should be performed. In all early operations it was a good plan where the invagination occurred in the ileocecal region to remove the appendix, for it might in certain instances be a causative factor in the production of the obstruction. In closing the wound one should reinforce the sutures of catgut with through-and-through tension sutures as the abdominal wall was subjected to considerable strain.

DR. LEON T. LE WALD said that through the kindness of Dr. Gould he had seen a case of intussusception in a male child sixteen months of age. This child was taken suddenly ill one morning, by noon he seemed somewhat worse, and at 4 P. M. he vomited. The following morning Dr. Gould asked him to confirm a diagnosis of intussusception and asked him whether he thought it dangerous to administer bismuth for the purpose of obtaining an x -ray. Dr. Le Wald said that he told him he thought there was a wrong impression as to the danger of administering bismuth in such a case, and that he believed that there was no danger provided the bismuth was administered carefully and in moderate amount.

The child was brought to the hospital and 75 grams of bismuth, in 250 c.c. of suspension medium, was given and inside of thirteen minutes they had the x -ray, had made the diagnosis and located the exact seat of the intussusception. Dr. Gould took the child to the operating room immediately for operation. The operation was successful and the intussusception was found in the ileocecal region just where it had been indicated by the x -ray. The ileum had traveled all the way back to the cecum and could be outlined by gas in the invaginated portion of the gut.

Dr. Le Wald said that this was the second case of this kind that he had seen diagnosed by the x -ray and bismuth, the first having been presented at the meeting of the Medical Society of the State of New York at Rochester last year. In Dr. Gould's case the tumor could not be felt even under anesthesia.

Dr. H. H. M. Lyle said that Dr. Peterson had given them a most able presentation and had impressed upon them the importance of early diagnosis in cases of intussusception in children. Early diagnosis is the keynote of surgical success.

Dr. Peterson claimed to have reported the first cases recorded in the literature. Dr. Lyle had not made a study of the literature but knew of four instances in which resection had been performed in children, one of them being in 1901. None of the patients were over three years of age, and one was an infant only a few days old.

In regard to the danger of administering bismuth, Dr. Lyle said he thought one should be guarded as to making statements regarding the harmlessness of this procedure. The result of administering bismuth in the face of intestinal obstruction was apt to be serious and fatalities had been recorded. One should consider very carefully the advisability, when confronted with the toxemia attendant on intestinal obstruction, of adding another element to an already serious condition. Dr. Lyle had been called in to operate on a case of acute intestinal obstruction which arose as the result of a bismuth

x-ray examination. We must remember that the conditions in an obstructed bowel are quite different from a normal one and that bismuth poisoning may occur. This has happened with fatal result.

DR. EVERETT W. GOULD said that in reference to the case which Dr. Le Wald reported that the clinical symptoms had been sufficient to make a fairly definite diagnosis, but that the x-ray examination which was made while Dr. Walton Martin was preparing for the operation clinched the diagnosis and definitely located the lesion. The ileum had invaginated the cecum not more than 3 or 4 inches, further invagination having been prevented by an old adhesion. The child made a good recovery. No resection was necessary.

DR. NORTHRUP asked Dr. Gould whether he could feel the tumor.

DR. GOULD replied that when he examined the child the previous evening he thought he felt a very slight resistance in the right iliac fossa, but the following morning he was unable to make out any tumor, and after the anesthetic had been administered Dr. Martin was unable to make out any definite tumor.

DR. J. FINLEY BELL of Englewood, N. J., said he thought the general practitioner found himself in something of a quandary when confronted with the apparent danger of an operation in a young child as compared with the introduction of air and water which seemed so much less formidable a procedure. Many physicians were laboring under a false impression as to the ability of young children to stand operative measures. This impression was probably strengthened by the fact that in cases in which operation seemed advisable it was delayed, while consultations and manipulations consumed time, until when the child actually came to operation it was in no condition to withstand the ordeal. With early diagnosis and early operation it would probably be found that children bore operative measures much better than had been supposed.

DR. JOHN C. A. GERSTER said that he could not agree as to the use of the right rectus incision. There was no question but that the median incision offered the most advantages. As said, the intussusception might be in any part of the abdomen and the median incision gives readiest access to all parts of the abdomen with least trauma.

Dr. Gerster said that time was an important element, and hence removal of the appendix unless it was gangrenous had better be left for a second operation, in which speed was not such a vital necessity.

DR. WILLIAM P. NORTHRUP said he had the misfortune many years ago to report two favorable cases of intussusception, which had occurred in the practice of Louis K. Neff, as having been cured by the introduction of water. He had since considered this a great mistake and had been trying to make amends.

The first patient had been brought to the office in the morning to consult in regard to vaccination. At two in the afternoon, Dr. Neff was sent for and found the child in great pain. By six in the evening the diagnosis of intussusception had been made and water

was introduced. Dr. Northrup said he had assisted on this occasion and under the pressure of the water one could feel the invagination give way. The child made a good recovery.

A second case almost identical with this came under their observation a week later. Here, too, under the same treatment, the child recovered.

These two cases illustrated everything brought out by Dr. Peterson, the acute stage of crying, severe pain, and pallor, followed by a period of quiescence and relaxation, and then the recurrence of severe symptoms. One could pick up the sausage-shaped tumor and could feel it disappear under the pressure of the water.

Dr. Northrup said he had tried to undo the mischief he might have occasioned by reporting those cases. Dr. Bell had struck the right note in what he had said regarding procrastination, that by the time the decision was made the child could not stand the operation. Speaking of shock of operation, it had been shown that in a child a few weeks old a gastroenterostomy could be done successfully.

THE PREVENTION OF GROSS DEFORMITIES IN POTT'S DISEASE.

(Lantern Slide Exhibit.)

DR. PERCY WILLARD ROBERTS said that what he wished to show by lantern slides was the results secured in the treatment of Pott's disease by a method advocated three or four years ago and which seemed to be of real value in preventing gross deformities. The first two or three slides showed cases inefficiently treated by plaster jackets and vertical suspension, and one showed an untreated deformity that might have been prevented by treatment. Dr. Roberts said that the method which he wished to present was most useful in treating deformities below the eighth dorsal vertebra, and that his talk would refer to lesions below that point. A number of slides were shown to demonstrate that a deformity might occur in any portion of the spinal column. The production of these deformities usually occurred in three stages: first, the softening of the bone by the tuberculous process; second, friction in rotation; and third, the collapse resulting in the deformity. The treatment of Pott's disease theoretically was to put the bones at rest and to protect them against friction and rotation. To carry out this theory the routine treatment had been by braces and plaster jackets. The Sayre jacket and the Taylor brace had been devised fifty years ago, and while they had been modified they had not been improved upon until recently. One could place reliance on these together with the chin brace in deformities in the high dorsal and cervical regions. The Sayre jacket immobilized perfectly and it appeared that it accomplished the point to be desired, immobilization of the spine and relief from weight. The vertebræ were separated somewhat and the patient received some relief but when he got on his feet again the body sagged or telescoped and permitted pressure at the point of the deformity, and there was again a little erosion necessitating a new jacket and so it went from jacket to jacket. This was not

always the case, but when it did happen it resulted in deformity such as had been shown. When there was any considerable deformity the upright suspension did not overcome it. This could be demonstrated by an ordinary carpenter's rule and weights. When a boy bent his hockey stick and wished to straighten it he applied force at the bend and in the opposite direction to the bend. The same principle should be applied in correcting a Pott's deformity. In order to accomplish this hyperextension, Dr. Roberts said he had devised a simple apparatus consisting of an ordinary automobile jack to which was attached a horizontal bar. From this bar was suspended a sling. The sling was passed around the patient's body at the point of the deformity and the hyperextension effected. While the patient was in this position the plaster jacket was applied. This jacket and sling method was particularly effective in correcting slight deformities and preventing gross ones. Its application was also very simple, one person being able to put up a case alone where it would require a number of assistants if done by the vertical suspension method. When the plaster was applied in the hyperextension position there was not the same tendency to telescope that had been observed by the other methods.

Dr. Roberts showed a number of slides illustrating the application of the sling, the gap between the vertebræ when in the hyperextension position and the results of the treatment. He expressed the opinion that there were some deformities that could not be corrected. There was extreme lordosis in some instances after the jacket was removed, but this would probably not be maintained. In the cases treated early there was very little deformity. Tracings shown demonstrated that there was a reduction or recession of the deformity in nearly all cases treated in this way. The point might be made that had been made with reference to other fields, that if the cases came to treatment early they did better. With this method of treatment the symptoms disappeared earlier, there were fewer abscesses developed, and the patient's comfort was enhanced during the application of the jacket and during the time of treatment.

DISCUSSION.

DR. H. H. M. LYLE said that Dr. Moorhead's cases spoke for themselves. The treatment of fractures of the femur in which there was overriding gave considerable trouble and the ordinary extension methods often failed to overcome the deformity. In the Steinmann Extension Method we had a valuable means, which could be regarded as being conservative when compared with open operation, plating, etc. The method is indicated in old neglected fractures. The writer has shown such a case at the last meeting of the Surgical Society and the one presented by Dr. Moorhead is a splendid example of the possibilities of the method. It is indicated in certain cases of malunion and it is the method of choice in all severe compound fractures. In these classes of cases it finds its greatest usefulness. The method is simple, quickly performed, and the

patient is strikingly comfortable. Four cardinal points are to be observed in inserting the pin. The fracture hematoma must be avoided, the pin must not enter the medullary canal, the joint or the epiphyseal line.

DR. JOHN C. A. GERSTER said that up to the present time his experience comprised a series of thirty cases, eleven of which were in children ranging from four to fifteen years of age.

Dr. Gerster said that he could not agree with Dr. Moorhead about certain minor points of technic. The rod carrying a detachable drill on its point is an unnecessary refinement. The sharp-pointed nail bores through the bone without any difficulty. A preliminary incision is also not necessary—it was tried in Germany and given up. Steinmann has given up hammering the nail—he uses it as a drill fixed in a brace. The pin is simply a bit of steel rod, pointed at one end.

Dr. Gerster uses nitrous oxide anesthesia only during the two or three minutes required to actually transfix the limb. Infection need not be expected with this method, if the proper asepsis is maintained. Pain and discomfort are less than with an efficient Buck's extension. Nursing is easier than with a Buck's extension—the child can raise the hips clear of the bed without the slightest pain.

In the presence of contusions or abrasions around the knee, one can safely wait a week or ten days without fear of getting a bad result.

In neglected fractures of some weeks' standing, nail extension is extremely valuable. Dr. Moorhead cited a case of five weeks' standing; two Dr. Gerster had were only of two weeks' duration.

In malunion with much shortening brilliant results have followed exposure and separation of the malunited fragments with simple closure of the wound and application of nail extension. Naturally more weight is required than in recent cases. Steinmann tells of such a case from the clinic of Anschütz at Kiel. A cavalry officer had malunion of a fractured femur of several months' standing. There was much shortening. The malunion was exposed at operation, the fragments were again separated, and the wound was closed. Nail tension was then applied, the shortening was overcome, union took place, so that three months after the patient was performing his duties as cavalry officer in the maneuvers.

The chances of union are much better with nail extension than with Lane plating, because in the former none of the osteogenetic tissue is removed. Besides, in nail extension, massage and passive motion may be begun as early as the fifth day (as mentioned by Dr. Moorhead).

DR. HENRY LING TAYLOR was very much interested in the cases shown and the results were most admirable. He had been particularly interested in the positive manner in which Dr. Moorhead had condemned plating as a routine measure. Personally he believed that the introduction of plating had done much harm because the man practising in small towns was led to use this method and might keep it up long after the man with greater experience had

seen the bad results and given it up. Plating was really valuable in only a few cases, while there were many cases that had gone wrong through this procedure.

There were one or two methods of treating fractures of the femur which were not mentioned by the reader of the paper. One was Van Arsdale's triangular splint to hold the thigh in the flexed position; this was applicable to fractures in the upper half of the femur, and the same result could be obtained by flexing the leg, reducing the deformity, and putting it in a plaster spica in that position. This was done quite frequently in babies at the Hospital for the Ruptured and Crippled and gave good results. The other method was by the use of Hawley's table, which was marvelously efficient in fracture cases, and by it the deformity could be reduced in early cases and a plaster splint could be applied without moving the patient.

Dr. Taylor said he was interested in Dr. Robert's work as well as in the operative method of treating Pott's disease. The basic principle for treating Pott's disease had been laid down fifty years ago by Taylor and Sayre and there had been no better methods suggested until within the past few years. During all those years the subject had remained *in statu quo*. Their principles were correct, namely, to put the part at rest in the best possible posture. Better results were obtained in private practice than in clinic work, though many cases did well in clinics. He recalled a case of a girl who had been treated by C. F. Taylor from 1871 to 1879 and cured with recession of the deformity. She returned in 1909, thirty years after her cure, and having been married and had children, she had no deformity. This showed what was possible in favorable cases, but all cases were not so favorable even in private practice. The brace treatment required a long time, though it was not necessarily irksome to the child or the parent as the pain and discomfort of the patient were promptly relieved and the general condition of the patient improved, but it was necessary to wear a brace for many years, and even in these cases the result was often mediocre. Other cases did well and had good backs at the end of three or four years.

Some years ago the profession had Callot's disease (Dr. Taylor said he used the word "disease" advisedly), Callot being then young and inexperienced believed that all one had to do to correct kyphosis was to use great force. His own expression was "*avec toutes mes forces*—straighten the kyphosis." The method presented this evening was a rational Callot's; Dr. Roberts applied a gentle force and one that was controlled, and undoubtedly this was a step in advance. One should bear in mind, however, that a case might be overcorrected and too much force should not be applied. Dr. Taylor heartily endorsed this method if it was used with discretion.

BRIEF OF CURRENT LITERATURE

DISEASES OF CHILDREN.

Influence of Atmospheric Conditions on Mortality of Infants with Gastrointestinal Disorders.—A. S. Bleyer (*Amer. Jour. Dis. Child.*, 1913, vi, 319) presents charts showing the total number of deaths from nonsurgical disorders and diseases of the gastrointestinal tract which occurred among infants in the first two years of life in St. Louis on each day of the months May, June, July, August and September of the years 1910, 1911, and 1912 (deaths in the first week of life were not included), the mean of the daily maximum and minimum temperatures, the mean relative humidity for each day as determined by averaging the relative humidity at 7 A. M. and 7 P. M., and the average wind velocity per hour for each day. These charts appear to show that definite relation between atmospheric heat and deaths among infants suffering with gastrointestinal disturbance exists; at what degree of heat lethal effects are seen does not appear in these charts. So-called "heat-peaks" or short-lasting but excessive temperatures doubtless emphasize, but they do not dominate the summer infant death rate; whether many of these deaths are the direct result of "heat-stroke," although easily supposable, has not been shown. Continuous heat shows a stronger relation, although not necessarily an immediate relation, to deaths of infants suffering with gastrointestinal disorders, which, as infants are now housed and fed, is very fairly constant.

Summer Diarrheas in Children.—Observations on summer diarrheas in children at the Boston Floating Hospital in 1911 were made by A. I. Kendall and A. A. Day (*Bos. Med. and Surg. Jour.*, 1913, clxix, 741, 753). The bacteriological data reported are derived from examinations of the stools from 146 cases, together with clinical and postmortem observations. The striking fact brought out is that in every case of infantile diarrhea studied (with the exception of the few fermentative diarrheas) there was a general conformity in bacterial type of the intestinal flora, which was uniformly proteolytic in character. This proteolytic flora forms a striking contrast to that of normal children of similar age, in which the putrefactive activities are minimal. Superimposed upon this proteolytic background various of the well-known intestinal pathogens may stand out conspicuously. In the past the isolation of such organisms has sufficed to establish the diagnosis; it now appears that such is not necessarily the case, inasmuch as one or more of them may be present without the production of noteworthy symptoms. On the other hand, cases are met with in which these organisms cannot be found, yet show blood, pus and mucus in the stools, and severe toxemia. In these latter cases the flora has been found to be proteolytic in character.

The summer of 1912 was noteworthy from the bacteriological point of view for the large number of cases of severe diarrheas in

young children, apparently of gas bacillus origin, 53 of a total of 135. Since an excess of utilizable carbohydrate and a deficiency of the normal acidoduric flora are the principal factors which permit an overgrowth of gas bacilli, the theoretical treatment would be a restriction of the carbohydrate and the introduction of appropriate acid-producing bacteria into the intestinal tract. Theoretically the simple expedient of restricting carbohydrate should bring relief in all except the desperate cases. Ordinarily the lactic acid which exists preformed in fat-free buttermilk (the vehicle in which lactic acid bacilli are ordinarily introduced) is immediately available, being carried rapidly to the site of gas bacillus activity by the increased peristalsis which is a feature of these diarrheas. The premises upon which this treatment is based appear to be sound. Feeding carbohydrate, particularly sugar, to this type of diarrheal cases results in a prompt rise of temperature, often several degrees, a prompt aggravation of the symptoms and an immediate increase in the number of stools.

A. I. Kendall (*ibid.*, p. 754) says that during the last three years at the Boston Floating Hospital the cases were caused by organisms of very unlike characteristics. One year the dysentery bacillus was the dominant type met with, a second year streptococci were conspicuous, while a third summer was noteworthy because of the great number of cases in which the gas bacillus was the prominent organism encountered. Each of the above types were found each year; the striking feature is the shifting of the dominant organism from year to year.

R. M. Smith (*ibid.*, p. 756) recognizes clinically two types of infectious diarrhea. The dysentery bacillus cases and the gas bacillus cases are sharply contrasted in this particular—that the patients with dysentery bacillus infection do well on carbohydrate feeding and badly on proteid feeding, while the gas bacillus cases do well on proteid feeding and badly on carbohydrate feeding.

Radiographic Study of Tracheobronchial Adenopathies in the Child.

—D'Oelsnitz and Paschetta (*Arch. de méd. des enf.*, Nov., 1913) have made a study of the value of radiographic examination of the thorax in children with reference to the detection of enlarged bronchiotracheal glands. They find that in order to get the best results the child must be placed in various positions and observed at various intervals. A simple plate made with the child facing the screen will give comparatively little information. The best method of examination is to place the child obliquely to the screen and have him gradually turn so as to expose more or less of the lateral wall of the thorax. The heart gives a shadow, and behind it is a clear space, behind which is another shadow of the contents of the posterior mediastinum. Here may be located the enlarged glands, lessening the clear space behind the heart; or the glands may be located laterally, adding to the breadth of the heart shadow. In the normal child the picture varies with the age, and the degree of repletion or emptiness of the abdominal organs. The form of the glandular shadow varies, the limits not being precise, and is difficult to de-

scribe. If enlarged glands are located at the hilum, the shadow tends to be prolonged outward and below. Tuberculosis of the lungs and enlarged thymus both obscure the diagnosis. Radiographic examinations frequently repeated in the same subject give valuable prognostic data. We can follow the evolution of the glandular growths with some exactitude. We can also see the value of the treatment administered. We can appreciate the value of preventive treatment which consists of removing the child from aggravating and hindering conditions. We can follow the effect of the fresh air cure in the gradual lessening of the size of the glands. The author has been convinced of the value of heliotherapy in some forms of adenopathy. He also believes that these frequent irradiations may have a favorable effect in reducing the glands.

Treatment of Scarlet Fever with Serum of Convalescents.—Richard Koch (*Münch. med. Woch.*, Nov. 25, 1913) has treated twenty-two cases of scarlet fever with injections of the serum of convalescent cases. The temperature is lowered in from six to twenty-two hours after the injection. No effect is seen on the duration of the rash, or on the complications, such as enlarged glands, otitis, or rheumatism. The effect seems to be on the symptoms of scarlatina pure, and not on the complications. The cases treated were of a severe type, and only one died, in whom the serum was used only one hour before death. Histories of the cases treated are given. The author is convinced of the efficacy of this serum treatment of scarlatina. The greatest influence is seen in the early stages of the disease, while even in late cases it may be noted. Hemorrhagic nephritis was not seen in any of the cases treated.

Skin Reaction to Diphtheria Toxin as Test for Prophylactic Antitoxin Injections.—B. Schick (*Münch. med. Woch.*, Nov. 25, 1913) details his experience with the skin reaction to diphtheria toxin used to ascertain whether the patient is already possessed of an immunity to diphtheria. If this is the case immunization with antitoxin becomes unnecessary for that individual. It has been found that in the new-born there is a congenital immunity in 80 per cent. of cases tested, and immunity is present in 90 per cent. of young infants. In older children this is found in about 50 per cent. and in adults less frequently. As a test a small dose of diphtheria toxin is injected superficially into the skin. If no reaction occurs the patient is immune to diphtheria toxin, antitoxins being already present in the blood. In the experience of the author only those took diphtheria who gave a positive reaction to this test. In the negative cases an injection of antitoxin would have been needless. In at least half of the infants under one year of age immunity exists. In hospitals and homes especially it will be of value to try this test, on account of the expense of antitoxin and the serum rostrus. The reaction shows itself in twenty-four hours. Only those having a reaction need be immunized. The reaction is shown by a reddening of the site, with infiltration; in severer reactions a more marked inflammation and pigmentation of the site of injection occurs.

Infantile Obesity.—George Mouriquand (*Ann. de méd. et chir. inf.*, Nov., 1913) in considering the subject of infantile obesity gives us a clinical study, including the cases of most interest that have been published since this subject has attracted notice. Among them are cases of adiposogenital syndrome accompanied by tumors of the hypophysis recognized at operation or autopsy, by traumatism of the hypophysis, or by tumors of neighboring regions; also those in which there was hydrocephalus, and in which there were no known lesions of the hypophysis. Some were associated with gigantism, acromegaly, nanism, or myxedema. Dercum's disease, or painful adiposity is included here. In connection with infantile obesity there are genital changes, in the female involving infantile conditions of the ovary and uterus, and amenorrhea, or irregular menstruation; in the male infantile testicles, and absence of secondary sexual characteristics. Accompanying these may be nervous and psychical troubles. When a tumor is present pressure symptoms occur, bitemporal hemianopsia, headache, somnolence, intellectual apathy, or epilepsy. In animals the hypophysis has been removed, and when the operation has been recovered from similar symptoms have been produced. The growth of the young animal is arrested; and the animal becomes very fat without increasing in weight. The sexual development is arrested. The adiposogenital syndrome is not in all probability produced by the disease of the hypophysis alone, but by its effect on the other glands of internal secretion, which appear to be interdependent. The thyroid become colloid, the thymus hypertrophies in young animals, the suprarenals and pancreas become altered. Obesity is a disease of retarded nutrition, and lessened oxidation, and is akin to diabetes, and to arthritism. Surgical treatment of tumor of the hypophysis has been of value. It has resulted in a partial regression of the syndrome. The x-rays also have proven of value, especially if applied when the skull is open. Opothrapy has been of benefit also in some cases. The best surgical results have been obtained when opothrapy has been used after the operation has been done. The author concludes that infantile obesity should not be considered as an entity, but as a complex pathological syndrome. Alteration or functional disturbance of certain glands of internal secretion, especially the genital glands, thyroid, and pituitary body should be considered responsible for the dystrophy. Pathological or experimental lesions of the hypophysis cause in infants and in young animals a syndrome characterized by increase in fat, atrophy of the genitals, and nervous manifestations, which are also seen in many so-called cases of essential obesity, which allow us to suppose that they have a lesion of the hypophysis. A study of the metabolism in cases of obesity, especially with reference to the hydrocarbons, brings us to recognize its relations to diabetes and raises important problems of heredity and prognosis. Aside from dietetics treatment of this syndrome has been successful enough to warrant further efforts in this direction.

Whooping Cough in the First Days of Life.—E. A. Cockayne (*Brit. Jour. Child. Dis.*, 1913, x, 534) records an unusually early case of

acquired pertussis. A boy, aged three and one-half years, whose mother was pregnant, began to cough on May 24, and whooped on June 9. The mother gave birth to a baby on May 26, and began to cough herself on May 29. The baby, a girl, began to cough on May 31, and whooped for the first time on June 10. The disease began at the age of five days, and the incubation period must have been four days, or less if the disease was caught from the brother, or two days if from the mother. The fact that the mother herself only developed the cough after the child was born precludes the possibility of intrauterine infection.

Local Treatment of Vincent's Angina with Salvarsan.—J. D. Rolleston (*Practitioner*, 1913, xci, 847) reports the successful treatment of a case of Vincent's angina with salvarsan. It had been ineffectually treated by application of methylene-blue powder, syringing with a solution of potassium chlorate and lavender, and painting with tincture of iodine. A throat swab, moistened with glycerine, was dipped in salvarsan powder and rubbed over the affected area. The application was not painful, and within four hours the throat felt much easier. The following day the slough was clearing off from palate and uvula but there were still numerous Vincent's organisms in the smear. Applications of salvarsan were made on this and the next day. Two days later no Vincent's organisms were found in the smear. Ten other cases of this treatment have been reported, with quick recovery in all but one.

Acute Acid Intoxication in Children.—Summing up and correlating various views as to the etiology of the condition, T. C. McCleave (*Jour. A. M. A.*, 1913, lxi, 1764) says that in children who suffer from periodic attacks of acid intoxication or recurrent vomiting, there is probably almost always some chronic focus of infection, adenoids, diseased tonsils, an inflamed bowel or appendix, or what not, the toxins from which, being constantly absorbed, act primarily on the liver. From time to time, by reason of the cumulative effect of the toxins, or to further disturbance of the already impaired equilibrium of metabolism by dietetic indiscretions, or by excitement, fatigue or other nervous element, there results a failure of the liver properly to perform its functions. The processes of carbohydrate metabolism are first disarranged, the frequency and severity of the attacks in childhood, perhaps, being due to the fact that the reserve supply of glycogen in the liver is not so great, proportionately in children as in adults, and that therefore any interference with the glycogen-storing or glycolytic powers of the liver, there being no longer a proper supply of sugar available, induces an immediate disturbance of fat and protein metabolism, manifested by the appearance in the urine of the toxic bodies. How these operate to produce the prostration, vomiting, rapid wasting, vasomotor changes, nervous disturbances and other characteristic symptoms cannot yet be explained. The determination and proper treatment of foci of infection are of fundamental importance. Next may be placed a properly balanced dietary, low in fats, with ample amounts of carbohydrate and milk and lean meats in moderation, with plenty

of green vegetables and fresh fruits. Constipation may be overcome by dietetic measures or by mild saline aperients if necessary, and the child's general hygiene should be carefully conserved. In children with frequent recurrence of attacks, a periodic thorough emptying of the large bowel with a saline laxative or castor oil, with the administration of a dram or two of sodium bicarbonate one day per week may be beneficial. Impending attacks, if recognized, may often be aborted by prompt catharsis and the free use of sodium bicarbonate. In the treatment of an established attack the bicarbonate is valuable. To meet the need for carbohydrate, sugar must be given in the form most available for utilization, dextrose. Extreme drying out of the tissues may be counteracted by saline infusions, prostration by appropriate stimulants, and nervous symptoms by opium, chloral or bromids, or by ice-packs or moist packs. As the vomiting subsides, gruels may first be given with orangeade or other fruit-juice drinks, gradually increasing the diet to normal.

Surgical Treatment of Brachial Birth Palsy (Erb's Type).—A. S. Taylor (*Amer. Jour. Med. Sci.*, 1913, cxlvi, 836), whose earliest report on this subject was published eight years ago, says that the essential etiologic factor consists in the forcible separation of the head and neck from the shoulder on the side of the lesion. The deep cervical fascia, the nerve sheaths, the nerves, and the accompanying vessels are torn. After a time the resulting blood clot and torn structures form a dense cicatrix which prevents nerve regeneration. As a rule the injury involves the roots in order from above downward and may vary in extent from a slight injury of the upper root to a complete rupture of the entire plexus. In some cases roots are torn from the cord itself. Secondary pathologic changes occur in the muscles, ligaments, and joint-ends of the bones. The paralyzed muscles fall into groups according to the roots injured. The characteristic attitude is one of marked inward rotation of the whole extremity, which is accented by the pronation of the forearm and hand. There is always some posterior displacement of the upper end of the humerus as compared with the normal side, and in a small proportion of cases there is complete posterior dislocation of the shoulder. Sensory disturbances are slight and usually soon disappear. Interference with growth is always present and is most marked about the shoulder girdle. Deformity usually increases with age. A cicatrix can easily be felt in the region of the damaged nerves, and is usually tender even after years. The prognosis is bad. There is nearly always some degree of deformity and paralysis which persists. Operation gives the best prospect for a useful arm. The best time for operation is as early as the general condition of the individual patient will permit (three to twelve weeks). In the few cases in which complete spontaneous recovery will occur, the paralysis is usually not extensive, improvement starts early and continues rapidly, and operation is evidently contraindicated. In debatable cases operation amounts to early exploration, with repair of such damage as is found. There is exceedingly little danger to

the operation, which amounts only to an incision through the skin and fat at the base of the neck. Up to the time of operation the extremity should be held up in a sling to take its weight off the damaged nerves and paralyzed muscles. In the cases where roots have been torn from the cord, they must be laterally implanted into the neighboring roots, or if the latter have been damaged enough to require resection, all of the distal nerve trunks may be sutured in a bunch to the proximal roots still attached to the cord. After operation the head and shoulder must be held in approximation for weeks by a steel brace fitted before operation. After-treatment must be systematic and persistent. Results will never be perfect, but operation will give improvement much greater than that obtainable by any other method.

Internal Hydrocephalus.—In the experiments of W. E. Dandy and K. D. Blackfan (*Jour. A. M. A.*, 1913, lxi, 2216) an obstruction was placed in the aqueduct of Sylvius, and thus the only way of exit for the cerebrospinal fluid from the third and the lateral ventricles was occluded. An internal hydrocephalus invariably resulted. When carefully performed there are no irritative or destructive symptoms from the operation. This hydrocephalus therefore is due to a purely mechanical obstruction in the aqueduct, as there is no interference with the veins of Galen. Since the venous obstruction is considered a possible cause of hydrocephalus, a series of experiments was conducted in which the vein of Galen and the straight sinus were ligated. In none of these cases did hydrocephalus result. In the studies of the absorption from the ventricles of patients with an internal hydrocephalus due to obstruction in the aqueduct, after the introduction of phenolsulphonephthalein in the lateral ventricles, there is excreted in the urine from 0.25 to 1 per cent. during a period of two hours; but when it is injected into the subarachnoid space of the same patient there is an excretion of from 35 to 60 per cent. in the urine in the same period of time. This demonstrates that the absorption of cerebrospinal fluid takes place almost entirely in the subarachnoid space. When phenolsulphonephthalein or other inert colored solutions are injected into the subarachnoid space, they appear in the lymph of the thoracic and right lymphatic ducts only after an interval of from thirty to fifty minutes, and only a faint trace is present even after two hours, whereas, they appear in the blood in three minutes and in the urine in six minutes and, as mentioned above, from 35 to 60 per cent. is excreted in the urine at the end of two hours. These facts indicate that the cerebrospinal fluid passes directly into the blood and that the lymph vessels are not concerned in its absorption. By injection of a suspension of fine granules or of phenolsulphonephthalein into the subarachnoid space the writers claim to have shown that cerebrospinal fluid is absorbed by a diffuse process from the entire subarachnoid space and is not restricted to any special locality, as, for instance, the region of the venous sinuses or the pacchionian granulations. From observations made on patients without hydrocephalus it has been possible to establish a normal standard for the excretion of phthalein after

its injection into one or the other of these cavities. By comparing the results of these tests with those obtained in hydrocephalus, we are enabled to establish two types of this disease. In the first type, the excretion of phenolsulphonephthalein after its injection into the subarachnoid space is practically normal (time of appearance from six to eight minutes, quantity excreted in two hours from 35 to 60 per cent.) after the injection of phenolsulphonephthalein into the ventricles, it has not, in the cases observed, appeared in the spinal fluid. In this group, necropsy has shown an obstruction to the passage of cerebrospinal fluid from the ventricles to the subarachnoid space. In the second type the excretion of phenolsulphonephthalein after its injection into the subarachnoid space is greatly diminished (from 8 to 15 per cent.), and the appearance time delayed (from twenty to thirty minutes). The amount excreted after its injection into the ventricles likewise is greatly diminished, undoubtedly due to the low subarachnoid absorption. In contradistinction to the first type the communication between the ventricles and the subarachnoid space is open. This is shown by the prompt (from two to three minutes) appearance in the spinal fluid of phenolsulphonephthalein after its injection into the ventricles.

Pathology and Symptoms of Thymus Disease.—Heinrich Klose (*Jahrbuch f. Kinderheil*, Dec. 6, 1913) says that his observations of hypertrophy of the thymus gland coincide with those of Basch. He finds that dogs which have had the thymus removed when under four weeks of age show marked changes in the bones. The bones of the extremities, especially the hind legs, show changes similar to those found in human rickets. They are smaller, thinner, and are easily fractured by the hand. There is a thickening and broadening of the line of junction between epiphysis and diaphysis. The gait of the animals is wabbling and uncertain. There is evident weakness of the muscular system, and flat-footed gait. When fractured the callus formation is less than in control animals. These changes are similar to those of spontaneous rickets. Autopsies have shown compensatory hypertrophy of the lymphatic apparatus. The final stage is one of cachexia and ends in coma. Disturbances of the endochondral ossification zones cause irregular ossification lines. The spinal cord is hyperemic. In the author's experiments the thymectomized dogs showed a fat, pasty condition, and infiltration of the muscular system with fats. This was followed by a lessening of muscular power, falling of the hair, and trembling of the body. The first characteristic bone change is the widening of the zone of bone formation. The second is the formation of a broad, less compact osteoid layer in place of the true bone. In the skull there are spots deprived of lime. Rats, swine, and chickens show similar changes. The author concludes that in thymectomized animals the same changes are found that are characteristic of rickets. In these animals dentition is delayed and irregular. In the central nervous system acidity of the brain substance is present, and it is more watery. There is an increased irritability of the peripheral nerves. The muscles show atrophy. The thymus has been called a

blood-producing organ, but the author believes that while its internal secretion stimulates the formation of blood cells by the other organs, the organ itself produces none. Experimental work goes to show that disease of the thymus results in grave changes in circulation and blood pressure. Intoxication is characterized by lowered blood pressure and final cardiac death. Removal of a hyperplastic thymus in children causes symptoms similar to those of Basedow's disease in the adult, dyscrasia, and heart disturbances. Matti found increase in the chromaffine cells after removal of the thymus. Adler found with hyperthymization also a hyperadrenalinemia. There appears to be an antagonism between the thymus and the genital glands. When the thymus has been removed the genitals are found increased in size and with supranormal parenchyma. Involution of the thymus takes place when the development of the genital apparatus goes on. Hypertrophy of the thymus causes pressure on the aorta, esophagus, or windpipe. The x-rays assist in the diagnosis of hypertrophy, and operation may be necessary to save life.

Internal Hemorrhagic Pacchymeningitis in Children.—Oscar Rosenberg (*Berl. klin. Woch.*, Dec. 8, 1914) says that there are three forms of internal hemorrhagic pacchymeningitis. The first is a form with latent beginning; the only symptoms noted by the mother are restlessness and headache, slowly increasing, through weeks. The physician notices a change and increase in the size of the head, open fontanel, and separation of the sutures. Diagnosis can be made only by puncture of the fontanel and examination of the fluid. The second form begins acutely with nervous symptoms: increased cerebral pressure, vomiting, restlessness, hydrocephalic cry, anxious face, hands clutching the head, and convulsions. Reflexes are increased, and spasms of the extremities are seen, and slight somnolence and stiffness of the neck. The third form is sudden, beginning with great severity; coma, convulsions, fever, strabismus, and stiffness of neck are present as in the severest form of meningitis. The symptoms that assist in diagnosis are the shape of the skull, the bulging fontanel and changes in the eye grounds. In twenty-seven cases examined eight showed hemorrhages into the retina at the outside of the field. There were seen hemorrhages into the lens, and upper and lower eye-lids. There may be changes in the optic nerve, atrophy and choked disc. Puncture of the fontanel yields fluid coming out under considerable pressure, and with characteristic changes. The fluid is bloody, or yellow, and contains red blood cells, sometimes hemolytic streptococci and increased albumin. In contrast the cerebrospinal fluid shows no changes except slight increase of pressure. The course of the disease is slow, with frequent relapses accompanied by fever, convulsions, and other nervous symptoms. At the end of three to five months the process is over and the sutures close. A deep sinking in of the fontanel is characteristic. The mortality is about 60 per cent. Puncture in the severe cases relieves somewhat. The exudate is found on the convexity of the brain, and consists of layers of membrane with hemorrhages between, and little fibrin. The fluid is of the character of a transudate as is

shown by the small amount of albumin, low specific gravity, absence of fibrin, and small number of cells. It is a transudate resulting from thrombosis of the blood system, probably in the cavernous sinus. In some cases birth injuries may be an etiological factor. Of thirty children, twenty-three had had a hemorrhagic catarrh of the nasal passages, and in eleven of these Klebs-Löffler bacilli were found. A form of luetic rhinitis is found with pachymeningitis. The value of these facts lies in the factor of a possible prevention of the disease which is an extension of an infectious thrombosis, causing thrombosis of the cavernous sinus, and extension to the surface of the brain.

Cerebral Symptoms of Labor Pneumonia in Children.—In recording eight cases of pneumonia in children with marked cerebral symptoms, F. H. Edgeworth (*Bristol Med. Chir. Jour.*, 1913, xxxi, 308) says that in every instance these symptoms were present when the child was first seen, *i.e.*, at dates varying from the first to the fourth day of the illness. This fact is of importance in the diagnosis, for when pneumococcal meningitis occurs as a complication of pneumonia the symptoms usually begin late in the illness.

Epilepsy in Children Traced to Single Alcoholic Intoxication of Parent.—M. Woods (*Jour. A. M. A.*, 1913, lxi, 2291) records four cases, in addition to three previously reported, in which an epileptic child was conceived at the time of a single inebriety of one or both parents who had been otherwise total abstainers. Although, according to the consensus of opinion, chronic drunkenness and its consequent degeneracy explain about 35 per cent. of epilepsies, it does not explain these cases reported, whose parents were not physically degenerate, who had no history of epilepsy or other neuroses in their respective families and who were not addicted to intemperance, or in any way enfeebled by disease or excess, except one father, who was consumptive in the last stages of the disease, living in a camp with other consumptives, and visited but on rare occasions by his entirely normal wife. The writer hazards the conjecture that it is not so much chronic drunkenness, as drunkenness at the time of conception, that causes the transmittal of an often overwhelming neurosis to offspring, and that at least some of these anomalies of apparently spontaneous development may be prevented by avoidance of the use of alcohol at the time of prospective procreation.

Staphylococcus Spray Treatment of Diphtheria Carriers.—W. A. Womer (*Jour. A. M. A.*, 1913, lxi, 2293) reports the following results: Of twenty-two cases of diphtheria treated with the spray, five cases, or 22.8 per cent., showed two negative cultures before thirty days, while of twenty-two cases not sprayed, four cases, or 18.2 per cent., cleared up before thirty days. In twenty cases of healthy carriers treated with the spray, seven cases, or 35 per cent., showed two negative cultures before thirty days, while of twenty cases not sprayed, four cases, or 20 per cent., cleared up before sixty days. Of forty-two throats treated with the spray, twelve cases, or 28.5 per cent., cleared up before thirty days. Of forty-two throats treated without the spray, eight, or 19 per cent., cleared up before thirty days. The

use of the spray caused no unpleasant symptoms, but did not appreciably lessen the period of quarantine. The preparation and distribution of the spray entails a large amount of work if there are many cases. Apparently most of the carriers do not spread the disease after sixty days from the day the disease begins.

Spinal Changes in Pseudohypertrophic Paralysis.—In examining the tissues of a boy of fifteen who had developed pseudohypertrophic paralysis at the age of seven, A. N. Bruce (*Edin. Med. Jour.*, 1914, xii, 42) found marked fatty infiltration of the muscles. There was proliferation of the sarcolemma nuclei, with atrophied, normal, and hypertrophied fibers, central nuclei, and considerable fatty infiltration and increase of the connective tissue. Many cells in the anterior horn of the spinal cord were reduced in size and some shrunken. Chromatolytic changes were only found here and there. In most cases the cells contained well-stained Nissl granules, which were present even in the shrunken cells. Increase of pigment in the cells was not observed. The actual number of nerve cells present was diminished by about one-quarter, but those remaining were either entirely normal or presented an appearance characteristic of diminished function, *i.e.*, they were small, but possessed Nissl granules and processes. There was a slight increase in the neuroglia in the anterior horns, undoubtedly secondary to the diminution in the number of the nerve cells. The atrophy and diminution of these ventral horn cells corresponded to the atrophy and diminution of the fibers in the anterior nerve roots, and on examining the nerve trunks in the muscles themselves similar changes were found, the fibers staining poorly, especially the myelin sheath, some being atrophied and the connective tissue in the sheath being increased. There was no evidence of any inflammatory process in the nerve sheaths. The pathological findings in this case are in favor of the view that the slight changes present in the spinal cord were merely secondary to the changes in the muscles.

Association of Acutely Fatal Illness in Infants and Children with Status Lymphaticus.—This is discussed by C. McNeil (*Edin. Med. Jour.*, 1914, xii, 25). In a group of thirteen infants from two to four months old, nearly all found dead in bed, and all apparently well developed and nourished, the lungs in every case examined (eight) showed marked congestion, bronchitis, and bronchopneumonia. This was associated in most cases with hyperplasia, general or partial, of the thymolymphatic system. These cases of sudden death in infants may therefore be described as cases of fulminant bronchitis and bronchopneumonia, associated with status lymphaticus. The same pathological grouping was found in all cases examined of a very unusual series of fulminant bronchopneumonia in boys from ten to sixteen years old. The regularity of this association raises the question whether the fulminant nature of the illness in both groups may not have been due in some way to the influence of the morbid constitution usually termed status lymphaticus, the signs of which were unequivocally present in both groups. There is some evidence that fulminant types of other bacterial infections—scarlet fever and

diphtheria—are also accompanied by thymolymphatic hyperplasia or status lymphaticus. In the two groups of fulminant pneumonia, thyroid hyperplasia in a marked degree was present in every case examined (eighteen). This thyroid hyperplasia seems to have existed for some time before death. The regular association of thyroid hyperplasia with thymolymphatic hyperplasia suggests that it (the former) may also be a mark of the same abnormal constitution or diathesis.

Scoliosis by Malformation of the Fifth Lumbar Vertebra.—Marie Nageotte-Wilbouchewitch (*Arch. de méd. des enf.*, Jan., 1914) says that the form of scoliosis which is shown by radiography to be due to a malformation of the fifth lumbar vertebra was not diagnosed before the use of the x-rays in examination of scoliosis. She cites a case in which the fourth and fifth lumbar vertebrae were markedly altered, the fifth being entirely flattened to the left. Thus a double curvature results to compensate for this wedge-shaped loss of substance. Cases of this kind are shown by radiography not to be rare. The malformation of these vertebrae is the key to the resistance of these scolioses to the ordinary methods of treatment. In these cases no pain is complained of as a result of the curvature. The author gives plates of a case in which there was shortening of the right leg due to a tuberculous knee, in which this wedge-shaped deformity was found. This case was made perfectly comfortable and the curvature was straightened out by placing under the shortened leg a high sole sufficient to give perfect equilibrium. The lumbar spine, previously rigid in standing, now became normally mobile. The author believes that the proper treatment of such cases is simply to raise one foot by a high heel until the tilting of the pelvis renders the spine straight. If we should apply the usual treatment of rest no improvement would result in the deformed vertebra and the health would suffer from confinement. Neither would exercises be likely to benefit these cases. The author thinks that in young children in whom ossification was not advanced, this tilting of the pelvis might possibly do harm by displacement of the pelvic organs; but in older children it does no harm. This treatment is rational, since the weight of the body would tend to cause the reshaping of the wedge-shaped vertebral body.

Physical Condition of Retarded School Children.—For the purpose of this study S. J. Baker (*Med. Rec.*, Jan. 10, 1914) selected four groups of schools in New York City, a total of twelve schools. The selection was made on the basis of the average school, without a preponderating attendance of children of any one nationality. Of 1202 pupils with physical defects, the records of 218 gave no information upon which causes for retardation might be based. The causes ascribed for the remaining 984 pupils are as follows, it being understood that in many cases a pupil had several factors checked up against him: mentality, 23.6 per cent.; foreigner (recent arrival), 11.7; late start, 19.4; personal illness, 27.4; illness at home, 2.6; quarantine, 2.5; conduct (including truancy), 5.6; absence (not specially defined), 8.2; frequent change in school, 3.4; and family

illiteracy, 1 per cent. Personal illness is assigned as the cause in 27.4 per cent. of these cases. The school hygienist should focus his attention upon this group of children who must inevitably, by virtue of their physical disability, be retarded in future physical resistance and good health in adult life.

Infant Mortality.—After discussing the reduction of infant mortality in New York City, L. E. Holt (*Arch. Pediat.*, 1913, xxx, 885) says that the essential parts of New York's campaign has been: Visits by trained nurses to the homes of ignorant mothers of newborn babies; extensive development of the milk depot and infant consultation; federation in one organization of all the agencies engaged in infant welfare work. Efforts in other cities to be successful must be made along these or similar lines. The time when individual effort can cope with this problem has passed. The present conditions call for an organized campaign, planned on scientific lines and carried out with business-like efficiency. Only such effort can meet the complex situation as it exists in our large cities to-day.

Heat and Infant Mortality.—J. W. Schereschewsky (*Arch. Pediat.*, 1913, xxx, 914) reviews the recent literature of this subject, particularly that of Germany where most statistical work has been done. He finds that the action of heat as a direct cause in the summer mortality of infants has been greatly underestimated in the last twenty-five years. The lethal action of heat is a function, not so much of the maximum and mean temperatures of the external air as of the indoor temperatures, which, in the late summer, may continue to be high in spite of remissions in temperature of the external air. The action of dirty and stale milk in causing the death of infants has been given a significance which has overshadowed other factors of equal or greater importance. There is evidence to show that a certain proportion of infant deaths are due to specific infections, in the dissemination of which contact infection and flies doubtless play a part. As a result, future activities for the prevention of infant mortality must concentrate themselves to a greater extent on the question of housing, especially the conditions productive of high indoor temperatures, such as overcrowding, narrow streets and the absence of through ventilation. Poor housing conditions can be partially neutralized by the proper care of babies in the summer. The general public should be educated as to the importance of high indoor temperatures in causing the death of infants, and especially as to measures which prevent babies from suffering from the heat. Breast feeding must still be regarded as a most, if not the most, important preventive of the summer death of infants.

Isolation and Quarantine Periods in Common Infectious Diseases.—C. B. Ker (*Edin. Med. Jour.*, 1914, xii, 6) regards scarlatinal desquamation merely as an outward and visible sign that a person has had scarlet fever. He approves of the rigid isolation of such patients when they are found in a tenement or class-room in which the disease has broken out. Their subsequent detention must depend on the facts of the case. He suggests that even an alteration of the

accepted minimum period of isolation from six weeks to five would be a great step in advance. As regards the period of quarantine to be imposed on contacts, in hospital outbreaks he is content with five days. Perhaps seven days might be ample for schools. A diphtheria patient must be kept until the necessary negative cultures have been obtained. Very often the illness lasts much longer than the infectivity. As regards the quarantine period the writer sees no use in continuing to quarantine perfectly well contacts who have given two successive negative cultures, which may well be obtained within three or four days. As regards children at any rate, cultures should be taken from every contact and the proved carriers isolated. There is little use in quarantining contacts for a fixed period, as, unless cultures are taken, it affords no security at all. The usual isolation period of measles in the City Hospitals is a fortnight from the period of eruption. The quarantine period for measles in hospital outbreaks is fifteen days. For rubella, Goodall's recommendation of isolation for seven days from appearance of rash seems ample. The long incubation period of this disease would appear to justify some attempt to employ the first two-thirds of it at least at school. Contacts could safely attend school for eight or nine days after exposure, and thereafter should be excluded until the twenty-first day is past. While the long periods of time in hospital spent by whooping-cough patients are of the very greatest advantage to the children themselves, in favorable circumstances and with otherwise healthy children, isolation until the whooping ceases is quite unnecessary. Of the great infectivity of whooping-cough in its prodromal catarrhal stage there is no doubt. Probably there is but little infectivity after the patient begins to whoop. Rigid isolation in a private house, is probably unnecessary after the paroxysmal stage has lasted for a week or ten days. In chicken pox the author believes that a patient is infectious until the last crust has separated, but when any given crust has become naturally detached, the secondary scab forming in its place is not necessarily dangerous. As regards quarantine for this disease, the writer often allows contacts to be mixed with other children up to the eleventh day, when they are isolated until the twenty-second. In mumps he has never seen harm result from allowing patients out of isolation when a full week has elapsed after the disappearance of swelling. Exclusion of contacts from the thirteenth to the twenty-sixth day from the date of the first and last exposure respectively would be a quite safe rule for schools to adopt.

Smallpox in Infants and Children.—Analysis by W. Hanna (*Brit. Jour. Child. Dis.*, 1914, xi, 1) of 215 cases of smallpox in children under fifteen years of age, taken from the smallpox records of the Liverpool hospitals during the past ten years reveals the fact that among the well vaccinated no cases are to be found under two years, and only seven cases between two and five years of age. The immunity conferred by vaccination in infancy gradually diminishes but still affords partial protection. Between two and five years all, or 100 per cent., are very mild cases, between five and ten years over

90 per cent. are very mild, and between ten and fifteen years over 80 per cent. are in the same category. No severe cases are to be found. The concurrent vaccination performed on a susceptible infant, if it does not entirely prevent, as it will do if performed within one or two days of the day of infection with smallpox, is found to modify the disease in the following directions. The papules may be very few and limited to isolated parts of the body; they pass, however, through the typical course of evolution; in addition to the limitation of papules the eruption itself is frequently modified, the lesions being superficially placed and maturing rapidly, the crusts rapidly inspissating and dropping off. It is found that this concurrent vaccination, if done within the first three days of infection, has the effect of almost entirely neutralizing the smallpox so that no symptoms or signs of the disease appear, or the attack will be very mild, such as the appearance of a few papules which may never become vesicles, but simply die away.

Nervous Complications of Varicella.—R. Miller and J. A. Davidson (*Brit. Jour. Child. Dis.*, 1914, xi, 15) report the following case: A boy, aged two and one-half years, developed a mild attack of varicella. The rash was moderate in amount and the constitutional symptoms were not severe, the temperature not exceeding 100° F. Nothing unusual was noticed until the morning of the fifth day, when after a normal night the child was found to be unable to stand, or to talk distinctly, and to show a tremor of the limbs, head and tongue. The onset of these symptoms was not associated with any fresh rash or rise of temperature. The tremor of the tongue quickly passed off, but when the child was seen four days later the tremor was very marked in the limbs. It was a slow rhythmic movement, which prevented him from standing without support. The movements of the limbs, particularly of the arms, were slow and stiff. There was no loss of emotional expression but the child was irritable and emotional. The cranial nerves and reflexes were normal. In a few days the tremor gradually diminished until it became only noticeable during excitement, and at the end of a month from the time of onset it had practically disappeared altogether. Since then the boy is thought to be a little more excitable than previously. The literature contains reports of one very similar case; one case of encephalitis affecting the oculomotor nuclei; one of infantile hemiplegia complicating varicella; two cases recorded as polioencephalitis but possibly meningismus; and one, reported as a case of sclérose en plaques but possibly cerebellar encephalitis. The writer also reviews the literature of other nervous complications of varicella.

Influence of Scarlet Fever on the Wassermann Reaction.—Bela Jakobovics (*Jahrbuch f. Kinderheil.*, Feb. 2, 1914) states that a positive Wassermann reaction is to be obtained in many cases of scarlet fever. Much and Eichelberg examined ten cases, testing from the third to the seventy-second day from the beginning of the disease. The reaction occurred after the acute symptoms were over, that is in the second or third week of the disease. They found no relation between the reaction and the intensity of the disease.

The author in the cases tested by him made three examinations, one in the exanthematous stage, and two later. He examined 178 sera, of fifty-five patients, and in thirty-seven specimens from eighteen patients obtained a positive reaction. In sixteen of these patients the reaction began between the twentieth and twenty-third days of the disease, that is after acute symptoms had subsided. The positive reaction ceased in sixteen cases between the thirty-fifth and forty-eighth days. In thirteen the positive reaction disappeared before desquamation was complete. In two cases it remained positive on the forty-second and forty-fourth days, when they left the hospital. In 83 per cent. of positive cases there was some necrosis in the throat, and only three were light cases. In three cases of nephritis following scarlet fever in which nine tests were made the results were negative. Positive reaction is seen earlier in severe cases. It often continues after the disease is over. No etiological data with reference to scarlet fever can be gained through this positive reaction.

Acute Optic Nerve Atrophy after Whooping-cough.—E. Roedelius (*Arch. f. Kinderheil*, Bd. 62, H. iii-iv, 1914) says that many infectious diseases are the cause of transient inflammation of the optic nerve, yet they seldom end in chronic nerve changes. Measles, scarlet fever, erysipelas, mumps, pneumonia, variola, typhus, influenza, rheumatism all may be followed by optic symptoms. The author observed atrophy of the optic nerve after whooping-cough in a four-year-old child, in an attack followed by many complications. There was no increased cranial pressure shown by lumbar puncture and the fluid showed no increase of leukocytes. This appears to have been a rare occurrence, no other being reported in medical literature. The author believes that it was the infectious element that caused the inflammation of the nerve, not any interference with the circulation through the violence of the paroxysms.

Leukocyte Counts in Pneumonia and Cerebrospinal Meningitis.—All six cases of cerebrospinal meningitis studied by J. H. Hess (*Amer. Jour. Dis. Child.*, 1914, vii, 1) were associated with a marked leukocytosis. The neutrophils were always the predominating cell before the administration of serum. There was a moderate but absolute lymphocytosis in all cases, most marked during convalescence, except in the one infected with measles. It was most marked in the fatal case. There was always an approximation and in some a crossing of the neutrophil and lymphocyte curves during convalescence. Eosinophils disappear absolutely very early in the infection and do not recur until convalescence has set in. With recrudescence and the reappearance of organisms in the spinal fluid, they again disappear. Following the withdrawal of spinal fluid and the injection of serum, there may be an increase in the total white and neutrophil count with a decrease of eosinophils, but although the late anaphylactic reactions may be associated with a rise in temperature, the polymorphonuclear cells remained low and eosinophils present. Although there may be a distinct increase occasionally, at no time was there a marked eosinophilia. Their

presence and reappearance was always associated with signs of good omen. Every case must be studied individually with reference to the findings presented, not only as to the presence of meningitis, but the possibility of secondary infections. Cellular blood examinations have no diagnostic value. Lumbar puncture is the source of accurate information. Much can be learned as to prognosis by regular examination of the leukocytes. A drop in the neutrophil count with an increase in the lymphocytes and a reappearance of the eosinophils indicates a good prognosis. An approximation of the neutrophil and lymphocyte curves is of good import. The leukocyte count is of most importance as an indicator for further prognostic punctures or the need of serum. An increase of the neutrophils and temperature with disappearance of the eosinophils should always lead to further spinal puncture. The temperature and cerebral reactions often associated with late anaphylaxis can be interpreted by careful leukocyte counts, and the further injection of serum, with its accompanying dangers, may be avoided. The neutrophils remain low and the eosinophils usually are present during this stage.

The writer studied fifty cases of pneumonia of different types. He says that leukocytosis in pneumonia as in other infections is dependent on two great factors: the reaction on the part of the organism, and the severity of the infection. This is peculiarly true of children whose course in the typical types is associated with a lower mortality than in adults while in the atypical, secondary types, we see the highest mortality of any age except that of senility. Generally speaking, a high count indicates a severe infection in an individual of strong powers, a moderate increase indicates either a slight infection with good resistance, or a severe type with an inadequate reaction. A low count suggests either a slight infection or an overpowering influence. It is impossible to make a reliable prognosis in pneumonia from the leukocyte count alone; however, when studied in relation to the clinical picture, the leukocyte count becomes of great prognostic significance. Primary pneumonias of infancy are usually of the lobar type. Bronchopneumonias are usually either secondary pneumonias or are seen in infants with low vitality. Young infants react to infections with a high neutrophil count, as do older children. The usual blood-picture in pneumococcus infections is that of a high neutrophil count with a moderate lymphocytosis before the crisis. A deviation from this picture should lead one to suspect lues, tuberculosis, typhoid or influenzal or other infections, or the presence of a rachitis or other complication. Excessively high counts are apparently more prone to the development of empyema and other complications, although it is impossible to say whether or not the hyperleukocytosis is not the result of an already infected pleura, etc., not demonstrable clinically. The neutrophil and lymphocyte curves approximate and occasionally cross each other during convalescence. There is a rapid fall in the neutrophils after the crisis. Pseudocrisis is associated with little or no reduction in the total count. A slow fall in the leukocytes with continued high fever indicates

either delayed resolution or complications. This is commonly seen in the secondary pneumonias. Sudden increases in the total and neutrophil counts during convalescence should lead to the suspicion of complications, as should a tendency to remain high. In secondary pneumonias the count varies with the associated complications. Frequently there is a high lymphocyte count. Eosinophils practically disappear during the height of the disease and usually reappear just before or following the crisis or with the beginning of lysis. Their recurrence can usually be considered a good sign. Disappearance of eosinophils does not depend on the presence or absence of a leukocytosis. When they have disappeared, however, the absolute decrease tends to remain until the white count nears the normal. They rarely reach an absolute count much above the normal. Their occurrence usually indicates that the infection has passed its acme, and is therefore of practical value for prognosis. Their disappearance may be retarded by outside factors, as the presence of *ascaris lumbricoides* in the intestinal tract and repeated pneumococcus infections. Their disappearance following their return with beginning convalescence should lead to the suspicion of beginning complications.

Disseminated Miliary Tuberculosis of Lungs and Skin.—W. P. Northrup (*Amer. Jour. Dis. Child.*, 1914, vii, 24) says that the modern x-ray apparatus, next to an autopsy, furnishes the most valuable insight to the lung lesion of infants and young children. Eruption of miliary tubercles furnishes a pathognomonic sign for diagnosis and a valuable, almost conclusive, point for prognosis; that is, the lesion is nearly always associated with a fatal form of tuberculosis in the young child. The histology varies with the acuteness of the invasion. Bacilli are found frequently in the blood and the eruption and the lesion is probably always embolic. Among the characteristics of the individual lesions may be mentioned the size, that of a rose spot in typhoid fever, topped by a tiny vesicle, surrounded sooner or later with a congested or hemorrhagic zone, with the formation of a crust, which, when removed, leaves a little pit. The skin lesion is to be differentiated from that of chicken-pox, molluscum contagiosum and syphilis. In the three cases recorded by the author the skin lesions were best described as a "necrotic tuberculid." There was merely melting down into necrosis where tubercle bacilli stopped and began to grow. There was no connective-tissue reaction, no giant cells, no surrounding zone of epithelioid and mononuclear wandering cells. In none of the zones were found evidences of protective reaction.

Gallop Rhythm and Extrasystole in Diphtheritic Myocarditis.—Woldemar Blacher (*Jahrbuch. f. Kinderheil.*, Feb. 2, 1914) declares that there are two types of galop rhythm found in diphtheritic myocarditis, presystolic and protodiastolic. These two types are more theoretic than practical, the difference having no influence on therapeutics or prognosis. The change in rhythm is a sign of heart weakness, yet the cause is different; the presystolic galop rhythm is an active symptom, and there is a qualitative and quantitative change

in the auricular action; the protodiastolic has to do with a passive condition in the beginning of the diastole. Romberg and Passler see the cause of the trouble in a medullary paralysis of the arteries, resulting in low blood pressure, partial filling of the vessels, and a large amount of the blood being held in the splanchnic circulation, thus rendering the other organs anemic. They are decompensation, slowing of the lesser circulation, swelling of the liver, and dilatation of the heart. We have to deal here with two factors, disturbances of the vasomotor centers and of the heart muscle at the same time. In diphtheritic myocarditis the tonus of the vegetative nerve system is of the greatest importance for the power of the heart. Diphtheritic poison is in the first rank of influences on the medullary centers. The author gives interesting histories of a number of cases, and sums up his conclusions thus: Gallop rhythm and extrasystoles appear with the beginning of the effects of the poison on the heart and this effect is seen in the circulation. Protodiastolic gallop rhythm is seen generally in severe myocarditis with decompensation and dilatation, while the presystolic is found in slight forms, and often indicates the appearance of kidney affections. Therefore the differentiation of these two forms has prognostic value. Increase of resistance in the general circulation manifests itself in constriction of the vessels and the decompensation and dyspnea arise from disturbances in the vasomotor system. The fact that presystolic gallop rhythm may be found in light as well as severe forms goes to show that it is not dependent on the grade of the anatomical lesion of the heart. It is a warning of active poisoning. A pathological increase of function of the musculature of the ventricles during diastole may be the cause of the protodiastolic gallop rhythm, and may come from increase of pressure in the general circulation. The cause of presystolic gallop rhythm is not always to be found in an increase of auricular systole. Clinical symptoms of diphtheritic myocarditis show that the dependence of gallop rhythm on influence on the central nervous system is probable. It apparently depends on an increase of the vagotonus; an overinfluence of the sympathetic system and increase of automatism arises. Therefore the occurrence of gallop rhythm is not a precise indication of the degree of anatomic lesion of the heart muscle, although gallop rhythm and changes in heart muscle often occur together. A causal relation between these two factors may be predicated only so far as the heart muscle injured by the diphtheritic poison loses the power to react to nervous, mechanical, and other influences. The same conclusions are probably correct for the extrasystoles and their clinical meaning is to be considered in the same light.

Mechanism of Circulatory Failure in Diphtheria.—Sudden death, in the course of acute infections, with symptoms like those of surgical shock, has been ascribed by some to disturbance of the vasomotor apparatus and by others to direct injury to the heart. In order to eliminate the influence of the vasomotors and study the heart by itself. W. G. MacCallum (*Amer. Jour. Med. Sci.*, 1914, cxlvii, 37) divided the dog's aorta near its root and connected it

with a long rubber tube, ending in a curved glass outlet, which could be elevated to any height upon a graduated upright pillar. The aortic pressure could in this way be set at any point, according to the height to which the heart must drive the blood against the force of gravity. The blood which escaped fell into a cistern and returned through another long tube to the distal part of the aorta. The dogs were given diphtheria toxin intravenously. The actual work of the diphtheria hearts was found to be at least as good as that of the normal hearts. To other dogs the writer gave diphtheria toxin intravenously and after death or killing perfused the heart with Ringer's solution. In all the beat was rather feeble as compared with that of the perfused normal heart and fibrillation seemed likely to occur, still they beat for several hours after they have shown every sign of failure in the body of the dying animal, if only the pressure of nutritive fluid be maintained in the coronary arteries, even if begun an hour after death of the animal. This seems to show that the death which occurs at the height of an attack of diphtheria is not exclusively the result of direct injury to the heart, although that may play some part in the process.

Subcutaneous Emphysema in Infants.—J. Comby (*Arch. de méd. des enf.*, Feb., 1914) says that subcutaneous emphysema may result from any acute affection of the respiratory organs, and is characterized by soft, colorless, painless swelling of the tissues, giving a feel of crepitation to the fingers. Lesions of the nasal fossæ and sinuses, larynx, trachea, bronchi or lungs, may all result in it. It is rarely due to a lesion of the esophagus, stomach or intestine. Gangliopulmonary tuberculosis often causes it; spasmodic bronchitis, whooping-cough, bronchopneumonia, diphtheria, and bronchial dilatations may all produce it. Air penetrates into the cellular tissues of the mediastinum and reaches the spaces at the base of the neck, face, trunk, and limbs. There are generally dyspnea, cyanosis of the lips, cold surface, fever, and pulmonary râles. The emphysema may disappear spontaneously in a few weeks; but in about half the cases the prognosis is bad, and death results from asphyxia. Treatment consists only in inhalations of oxygen for the dyspnea, purgatives, antispasmodics, digitalis and theobromine to assist the circulation, with heat applied to the extremities.

Bronchial Dilatations and Heredosyphilis in the Child.—J. Milhit (*Arch. de méd. des enf.*, Feb., 1914) says that Hutinel found that bronchial dilatations in children had very different characteristics from those in adults. They are smaller, suppurate less, and are discovered only when there is an acute bronchial catarrh. There is no cough, expectoration, or fetid breath. Their frequency in children is admitted. Heredosyphilis plays an important etiological part in their development, and it should be systematically searched for in all cases. The proof of their cause is given by the finding of abundant treponemata in the lesions at autopsy, in the new-born. In the infant ampullar cavities are found in the midst of gray, sclerotic parenchyma, and might be mistaken for tuberculous cavities. Positive Wassermann reactions are also present. The tuberculosis

of the child is miliary, not caseous or fibrous, and hence may be excluded from their etiology. Among the author's cases three out of five having bronchial dilatations gave a positive Wassermann and stigmata of syphilis. The signs also improved rapidly under anti-syphilitic treatment. The diagnosis of these dilatations is very difficult in the child. The dilatations may be long, or globular, superficial or deep. The lining is gray and villous, or red and smooth. Syphilis may pave the way for the disorders causing dilatation. Wassermann reaction and stigmata of syphilis should always be looked for in dilatations.

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ORIGINAL COMMUNICATIONS

A CRITICAL REVIEW OF 500 PUBLISHED AND
UNPUBLISHED CASES OF ABDOMINAL
CESAREAN SECTION FOR ECLAMPSIA.*

BY

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THREE years ago I laid before this Society the results of an analysis of 530 published and unpublished cases of eclampsia treated by vaginal Cesarean section. Even if the conclusions of this paper have not been accepted in their entirety, at least their presentation has given rise to free discussion and in that way good has resulted. For the past three years I have been engaged in collecting published and unpublished cases of eclampsia treated by abdominal Cesarean section in order that I might be in a position to study carefully the results of this method of treating eclampsia. The work was begun with no idea of proving or disproving the value of this operative procedure in eclampsia. It was proposed to make it a study, an impartial analysis of cases where the uterus had been emptied by the suprapubic route either in the interest of the eclamptic woman or her child. This should be clearly understood at the outset for the value of the work will depend largely upon how the cases have been collected and whether they have been studied with an unbiased mind. Everyone knows how easy it is to prove or disprove anything by statistics, and because this is resorted to so frequently by violent partisans a doubt has arisen as to the value of medical statistics. This is a mistake, in my opinion, for an impartial scientific statistical study of any medical topic is exceedingly valuable and well-high indispensable in judging of the value of certain lines of treatment.

*Read in abstract before the American Gynecological Society, May 20, 1914.

The same method was employed in the collection of the present series of cases as was used in preparing the article on vaginal Cesarean section. Letters were sent to prominent obstetricians, gynecologists and surgeons in this country and abroad stating the purpose of the research work and requesting the privilege of including in the statistics any cases of eclampsia in which abdominal Cesarean section had been performed. In addition, the letters stated that the writer would consider it a favor to be referred to any one who had had occasion to treat eclampsia by this method. Through the kindness and courtesy of many correspondents I have been able to gather together for statistical purposes 500 published and unpublished

OPERATORS FROM THE UNITED STATES

No.	Name	Address	Cases		
			Published	Unpublished	Total
1	Allen, L. M.....	Winchester, Va.....	0	1	1
2	Anderson, M. L.....	Richmond, Va.....	0	1	1
3	Arp, A. H.....	Moline, Ill.....	0	1	1
4	Austin, O. L.....	Tuckahoe, N. Y.....	0	2	2
5	Baldwin, J. F.....	Columbus, O.....	0	2	2
6	Barkley, A. H.....	Lexington, Ky.....	0	5	5
7	Barlow, O. H.....	Norfolk, Va.....	0	1	1
8	Boldt, H. J.....	New York City.....	1	0	1
9	Boyd, G. M.....	Philadelphia, Pa.....	1	0	1
10	Brand, W. W.....	Toledo, O.....	0	1	1
11	Brent, H. W.....	Baltimore, Md.....	0	1	1
12	Bromberg, P.....	Nashville, Tenn.....	0	1	1
13	Brothers, A. (Deceased)	.....	1	0	1
14	Brown, D. J.....	Springfield, Mass...	0	13	13
15	Bryan, W.....	West New Brighton, N. Y.	0	3	3
16	Buechner, W. H....	Youngstown, O.....	0	2	2
17	Bullock, W. O.....	Lexington, Ky.....	0	1	1
18	Burch, L. E.....	Nashville, Tenn.....	0	1	1
19	Burns, T. M.....	Denver, Colo.....	5	3	8
20	Cannon, W. T.....	Salt Lake City, Utah	0	1	1
21	Carr, W. P.....	Washington, D. C..	0	4	4
22	Chandler, T. E.....	Boston, Mass.....	0	3	3
23	Clark, J. R.....	San Francisco, Cal..	0	1	1
24	Cole, C. G.....	New Orleans, La....	0	1	1
25	Coleman, D.....	Richmond, Va.....	0	1	1

OPERATORS FROM THE UNITED STATES (*Continued*)

No.	Name	Address	Cases		
			Published	Unpublished	Total
26	Collins, C. U.....	Peoria, Ill.....	0	1	1
27	Connell, F. G.....	Oshkosh, Wis.....	0	1	1
28	Craig, W. B.....	Denver, Colo.....	0	4	4
29	Crisler, J. A.....	Memphis, Tenn.....	0	1	1
30	Davis, A. B.....	New York City.....	0	11	11
31	Davis, E. P.....	Philadelphia, Pa....	2	3	5
32	De Lee, J. B.....	Chicago, Ill.....	0	1	1
33	Denny, D. W. C..... (Deceased)	.....	1	0	1
34	Fitch, J. W.....	Portsmouth, O.....	0	1	1
35	Foster, T. A..... (Deceased)	.....	1	0	1
36	Frederick, C. C..... (Deceased)	.....	1	0	1
37	Friedman, L. V.....	Boston, Mass.....	0	1	1
38	Gamble, H. F.....	Charleston, W. Va..	1	0	1
39	Gessner, H. B.....	New Orleans, La....	0	1	1
40	Green, C. M.....	Boston, Mass.....	0	2	2
41	Gunther, E. E.....	Newark, N. J.....	0	2	2
42	Haggard, W. D.....	Nashville, Tenn.....	2	0	2
43	Harrar, J. A.....	New York City.....	0	1	1
44	Harrison, T. L.....	Drewsey, Ore.....	1	0	1
45	Hasbrouck, E. M....	Washington, D. C...	0	1	1
46	Hill, R. S.....	Montgomery, Ala....	0	1	1
47	Hipke, G. A.....	Milwaukee, Wis.....	0	3	3
48	Hirst, B. C.....	Philadelphia, Pa....	0	2	2
49	Hoffman, L. H.....	San Francisco, Cal..	0	1	1
50	v. Hoffmann, C.....	San Francisco, Cal..	0	1	1
51	Holmes, R. W.....	Chicago, Ill.....	0	1	1
52	Hoee, A. B.....	Washington, D. C...	0	1	1
53	Horsley, J. S.....	Richmond, Va.....	0	2	2
54	Hotaling, A. S.....	Syracuse, N. Y.....	1	1	2
55	Howard, C. T.....	Boston, Mass.....	0	1	1
56	Howell, C. A.....	Columbus, O.....	0	1	1
57	Huggins, R. R.....	Pittsburg, Pa.....	0	1	1
58	Humphrey, W. A....	Toledo, O.....	0	1	1
59	Hussey, A. A.....	Brooklyn, N. Y.....	0	1	1
60	Ill, C. L.....	Newark, N. J.....	1	12	13

OPERATORS FROM THE UNITED STATES (*Continued*)

No.	Name	Address	Cases		
			Published	Unpublished	Total
61	Ill, E. A.....	Newark, N. J.....	0	1	1
62	Ill, E. J.....	Newark, N. J.....	0	6	6
63	Jack, W. A.....	Washington, D. C....	0	1	1
64	Jackson, F. H.....	Houlton, Me.....	1	0	1
65	Jackson, J. N.....	Kansas City, Mo....	0	1	1
66	Johnson, S. H.....	Bellingham, Wash...	1	1	2
67	Johnston, G. B.....	Richmond, Va.....	1	4	5
68	Johnston, W.....	Richmond, Va.....	1	4	5
69	Kelley, J. T.....	Washington, D. C ..	0	1	1
70	Knapp, C. B.....	New York City.....	0	1	1
71	Kohlman, W.....	New Orleans, La....	0	1	1
72	Kreutzmann, H. J....	San Francisco, Cal..	0	1	1
73	Lynch, C. F.....	Springfield, Mass....	0	3	3
74	Mac Lean, H. S.....	Richmond, Va.....	0	5	5
75	Macrae, D.....	Council Bluffs, Ia...	0	3	3
76	Maguire, D. L.....	Charleston, S. C....	0	1	1
77	Mann, H.....	Richmond, Va.....	0	1	1
78	Markoe, J. W.....	New York City.....	0	9	9
79	Marsh, J. P.....	Troy, N. Y.....	3	1	4
80	Martin, P. F.....	Indianapolis, Ind....	1	0	1
81	Matthews, O. H....	Atlanta, Ga.....	0	1	1
82	McGuire, S.....	Richmond, Va.....	0	1	1
83	McPherson, R.....	New York City.....	0	1	1
84	Means, W. J.....	Columbus, O.....	0	1	1
85	Morris, L. C.....	Birmingham, Ala....	0	1	1
86	Mullally, L.....	Charleston, S. C....	2	4	6
87	Nason, F. T.....	McKeesport, Pa	0	14	14
88	Neale, L. E.....	Baltimore, Md.	0	3	3
89	Norris.....	Toledo, O.....	0	1	1
90	Norris, R. C.....	Philadelphia, Pa....	0	1	1
91	Painter, H. McM....	New York City.....	0	1	1
92	Perkins, J. W.....	Kansas City, Mo....	0	1	1
93	Peterson, R.....	Ann Arbor, Mich....	0	1	1
94	Poucher, J. W.....	Poughkeepsie, N. Y.	1	0	1
95	Prince, E. M.....	Birmingham, Ala....	2	1	3
96	Redmon, L. C.....	Lexington, Ky.....	0	2	2
97	Reid, W. B.....	Rome, N. Y.....	1	0	1
98	Richmond, J. L.....	.....	1	0	1
	(Deceased)				

OPERATORS FROM THE UNITED STATES (*Continued*)

No.	Name	Address	Case		
			Published	Unpublished	Total
99	Ricketts, B. M.....	Cincinnati, O.....	0	1	1
100	Robins, C. R.....	Richmond, Va.....	0	3	3
101	Sanders, St. E.....	Kansas City, Mo....	0	1	1
102	Schaefer, C. R.....	Indianapolis, Ind...	1	0	1
103	Schell, J. T.....	Philadelphia Pa.....	1	0	1
104	Schell, W.....	Terre Haute, Ind...	1	0	1
105	Schoolfield, G. C....	Charleston, W. Va...	0	1	1
106	Seelye, R. H.....	Springfield, Mass...	0	1	1
107	Sherbondy, J. A....	Youngstown, O.....	0	1	1
108	Skeel, R. E.....	Cleveland, O.....	1	1	2
109	Slemons, J. M.....	Baltimore, Md.....	0	2	2
110	Smith, R. K.....	San Francisco, Cal..	0	1	1
111	Smith, Wayne.....	St. Louis, Mo.....	0	2	2
112	Smith, Willard.....	Phoenix, Ariz.....	1	0	1
113	Stafford, S. W.....	New Orleans, La....	0	1	1
114	Stillwagen, C.....	Pittsburg, Pa.....	2	0	2
115	Stone, I. S.....	Washington, D. C...	0	1	1
116	Supple, E. A.....	Boston, Mass.....	0	3	3
117	Sweet, F. B.....	Springfield, Mass...	0	2	2
118	Todd, G. M.....	Toledo, O.....	0	4	4
119	Truesdell, E. D.....	New York City.....	0	1	1
120	Van Sweringen, B...	Fort Wayne, Ind....	1	1	2
121	Wallace, W. L.....	Syracuse, N. Y.....	0	1	1
122	Watkins, J. T.....	Chicago, Ill.....	0	1	1
123	Weller.....	Toledo, Ohio.....	0	1	1
124	Wesselhoeft, C.....	Boston, Mass.....	0	1	1
125	Williams, D. H.....	Dallas, Tex.....	1	0	1
126	Williams, E. M.....	Patterson, La.....	0	5	5
127	Williams, J. W.....	Baltimore, Md.....	0	2	2
128	Wilson, K. M.....	Baltimore, Md.....	0	1	1
129	Woodbury, F. T....	Fort Screven, Ga...	2	0	2
130	Wysor, J. C. and Ayers, E. A.	Cliftonforge, Va....	1	0	1
131	Zimmermann, V. S..	Brooklyn, N. Y.....	0	1	1
	Total.....	.....	46	230	276

OPERATORS FROM GERMANY

No.	Name	Address	Cases		
			Published	Unpublished	Total
1	Alsberg, P.....	Charlottenburg b. Berlin.	2	0	2
2	Biermer, R.....	Wiesbaden.....	1	0	1
3	Burmeister, T.....	Stettin.....	1	0	1
4	Czempin, A.....	Berlin.....	1	0	1
5	Dauber, H.....	Würzburg.....	1	0	1
6	Dienst, A.....	Oppeln.....	3	0	3
7	Döderlein, A.....	München, Bayern...	1	2	3
8	Dorff..... (Deceased)	.....	1	0	1
9	Engelmann, F.....	Dortmund.....	2	2	4
10	Esch, P.....	Marburg.....	3	0	3
11	Everke, C.....	Bochum, Westphalen	9	3	12
12	Fehling, H.....	Strassburg, i/E.....	1	2	3
13	Frank, F.....	Köln, a/Rh.....	2	0	2
14	Freund, H.....	Strassburg, i/E.....	1	1	2
15	Friedemann, B.....	See bibliography....	1	0	1
16	Friedemann, G.....	Stettin.....	1	0	1
17	Glaser.....	Frankfurt, a/M.....	1	0	1
18	Götze, A..... (Deceased)	.....	1	0	1
19	Goldberg, O.....	Dresden.....	1	0	1
20	Gottschalk, O.....	Berlin.....	1	0	1
21	Graefe, M.....	Halle, A/S.....	1	0	1
22	Griesel, M.....	Jena.....	2	0	2
23	v. Guérard, H. A.... (Deceased)	.....	1	0	1
24	Gusserow..... (Deceased)	.....	1	0	1
25	Haindl, G.....	Erlangen.....	1	0	1
26	Hammerschlag, S....	Berlin.....	2	0	2
27	Hartwig.....	Hanover.....	2	0	2
28	Heinze, H.....	Breslau.....	1	0	1
29	Henkel, M.....	Jena.....	0	5	5
30	Herrenschneider....	Kolmar.....	1	0	1
31	Hildebrandt.....	Lüneberg.....	1	0	1
32	Hillmann, H.....	Jena.....	1	0	1
33	Kalisch.....	See bibliography....	1	0	1
34	Kaltenbach..... (Deceased)	.....	1	0	1
35	Klein, G.....	München, Bayern...	1	0	1
36	Kroemer.....	Berlin.....	1	0	1

OPERATORS FROM GERMANY (*Continued*)

No.	Name	Address	Cases		
			Published	Unpublished	Total
37	Küstner, O.....	Breslau.....	6	0	6
38	Kupferberg, W.....	Mainz.....	0	1	1
39	Laubenburg, K. E..	Remscheid.....	1	2	3
40	Leopold, G..... (Deceased)	.....	1	0	1
41	Loewenstein, H.....	Frankfurt, a/M....	2	0	2
42	Martin, A.....	Berlin.....	1	0	1
43	Meller, J.....	Würzburg.....	1	0	1
44	O. R.....	See bibliography....	1	0	1
45	Oldeystella, J.....	Leipzig.....	0	1	1
46	Olshausen, R.....	Berlin.....	3	0	3
47	Opitz, E.....	Düsseldorf.....	1	1	2
48	Pomy, L.....	Göttingen.....	3	0	3
49	Poten.....	Hanover.....	1	0	1
50	Runge, E.....	Berlin.....	2	0	2
51	Schatz.....	Rostock, i/M.....	1	0	1
52	Schmidt.....	See bibliography....	1	0	1
53	Schreiber, G.....	Rodheim, v. d. H...	1	0	1
54	Schütte.....	Gelsenkirchen, Westphalen.	1	0	1
55	Seiffart, H.....	Nordhausen.....	2	0	2
56	Seitz, L.....	München, Bayern....	2	0	2
57	Simrock, E.....	Frankfurt, a/M....	1	0	1
58	Sippel, A.....	Frankfurt, a/M....	1	0	1
59	Stäude.....	Hamburg.....	1	4	5
60	Steinbrecher.....	See bibliography....	1	0	1
61	Strassmann, P.....	Berlin.....	1	0	1
62	Stumpf, M.....	München, Bayern...	1	0	1
63	v. Swieicki, H.....	Posen.....	1	0	1
64	Veit, J.....	Halle, a/S.....	1	4	5
65	Walcher, G.....	Stuttgart, Würtem- berg.	1	0	1
66	Wanner, R.....	Düsseldorf.....	1	0	1
67	Zweifel, P.....	Leipzig.....	1	5	6
	Total.....	.....	95	33	128

OPERATORS FROM THE NETHERLANDS

No.	Name	Address	Cases		
			Published	Unpublished	Total
1	Van den Akker.....	See bibliography....	1	0	1
2	Halbertsma, T.....	Utrecht.....	4	0	4
3	Hefting, J. D.....	Amsterdam.....	1	0	1
4	van der Hoeven.....	Leyden.....	1	0	1
5	Kefting,	Euurem.....	1	0	1
6	Kramer, A. J. H....	Eindhoren.....	1	0	1
7	Metzlar, C.....	Apeldoorn.....	1	0	1
8	van der Mey..... (Deceased)	.....	1	0	1
9	Nijhoff, J. C.....	Groningen.....	0	1	1
10	van de Poll, C. N...	Amsterdam.....	1	0	1
11	Reijenga, J.....	Groningen.....	1	0	1
12	Ribbius, P.....	Arnhem.....	1	1	2
13	Risseeuw, A. J.....	Haarlem.....	4	0	4
14	Trenite, N. A. H....	The Hague.....	1	0	1
15	Treub, H.....	Amsterdam.....	1	0	1
Total.....			20	2	22

OPERATORS FROM AUSTRIA

No.	Name	Address	Cases		
			Published	Unpublished	Total
1	Bäcker, J.....	Budapest.....	1	0	1
2	Braun, G..... (Deceased)	.....	1	0	1
3	v. Braun-Fernwald, R.	Wien.....	1	0	1
4	Neumann, J.....	Wien.....	2	0	2
5	Ostreil, A.....	Prag.....	1	0	1
6	v. Rosthorn..... (Deceased)	.....	1	0	1
7	Rotter, H.....	Budapest.....	1	0	1
8	Schauta, F.....	Wien.....	1	0	1
9	Wertheim, E.....	Wien.....	2	0	2
Total.....			11	0	11

OPERATORS FROM SWITZERLAND

No.	Name	Address	Cases		
			Published	Unpublished	Total
1	Brunner, C.....	Münsterlingen.....	2	0	2
2	v. Herff, O.....	Basel.....	1	0	1
3	Müller, P.....	Bern.....	2	10	12
4	Rossier, G.....	Lausanne.....	1	0	1
5	Weber, E.....	Bern.....	1	0	1
6	Wegelin, C.....	Bern.....	1	0	1
Total.....			8	10	18

OPERATORS FROM RUSSIA

No.	Name	Address	Cases		
			Published	Unpublished	Total
1	Beckmann, W.....	St. Petersburg.....	0	2	2
2	Keyserlingk, R. B..	Reval.....	1	0	1
3	Knüpffer, A.....	Reval.....	1	0	1
4	Michailoff, N.....	Rostow, a/D.....	0	8	8
5	Pobjedinski, N.....	Moscow.....	2	0	2
6	Sewijugo, N. S.....	See bibliography....	2	0	2
Total.....			6	10	16

OPERATORS FROM ITALY

No.	Name	Address	Cases		
			Published	Unpublished	Total
1	Balatresi, U.....	See bibliography....	1	0	1
2	Bidone, E.....	Bologna.....	1	0	1
3	Caruso, F.....	Catania.....	1	0	1
4	Coen.....	See bibliography....	1	0	1
5	Decio, C.....	Colietti Milan.....	1	0	1
6	Montini, A.....	Seregno.....	1	0	1
	Total.....	.....	6	0	6

OPERATORS FROM SWEDEN

No.	Name	Address	Cases		
			Published	Unpublished	Total
1	Essen-Möller, E.....	Lund.....	1	0	1
2	Lennander, K. E. (Deceased)	.....	2	0	2
3	Lundblad, O.....	Vänersborg.....	2	0	2
4	Salin, M. J.....	Stockholm.....	1	0	1
	Total.....	.....	6	0	6

OPERATORS FROM ENGLAND

No.	Name	Address	Cases		
			Published	Unpublished	Total
1	Favell, R.....	Sheffield.....	1	0	1
2	Maxwell, R. D.....	London.....	1	0	1
3	McCann, F. J.....	London.....	1	0	1
4	Walls, W. K.....	Manchester.....	1	0	1
	Total.....	.....	4	0	4

OPERATORS FROM SCOTLAND

No.	Name	Address	Cases		
			Published	Unpublished	Total
1	Croom, J. H.....	Edinburgh	1	0	1
2	Croom, Sir H.....	Edinburgh.....	1	0	1
3	Morison, A. E.....	Sunderland.....	1	0	1
4	Russell, A. W.....	Glasgow.....	1	0	1
Total.....			4	0	4

OPERATORS FROM IRELAND

No.	Name	Address	Cases		
			Published	Unpublished	Total
1	Maguire, K. M. N..	Dublin.....	1	0	1
2	Smyly, Sir W.....	Dublin.....	1	0	1
Total.....			2	0	2

OPERATORS FROM FRANCE

No.	Name	Address	Cases		
			Published	Unpublished	Total
1	Bonnaire, E.....	Paris.....	1	0	1
2	Paucot, H. and Leclercq.	Paris.....	1	0	1
Total.....			2	0	2

OPERATORS FROM CANADA

No.	Name	Address	Cases		
			Published	Unpublished	Total
1	Reddy, H. L.....	Montreal.....	1	2	3
	Total.....	.....	1	2	3

OPERATORS FROM AFRICA

No.	Name	Address	Cases		
			Published	Unpublished	Total
1	Klots, P. S.....	Transvaal.....	1	0	1
	Total.....	.....	1	0	1

OPERATORS FROM AUSTRALIA

No.	Name	Address	Cases		
			Published	Unpublished	Total
1	Batchelor, F. C.....	See bibliography....	1	0	1
	Total.....	.....	1	0	1

Total number of published cases..... 213
 Total number of unpublished cases..... 287
 Total number of cases..... 500

CASES

	Published	Unpublished	Total
United States.....	46	230	276
Germany.....	95	33	128
Netherlands.....	20	2	22
Austria.....	11	0	11
Switzerland.....	8	10	18
Russia.....	6	10	16
Italy.....	6	0	6
Sweden.....	6	0	6
England.....	4	0	4
Scotland.....	4	0	4
Ireland.....	2	0	2
France.....	2	0	2
Canada.....	1	2	3
Africa.....	1	0	1
Australia.....	1	0	1
Total.....	213	287	500

OPERATORS

United States.....	131
Germany.....	67
Netherlands.....	15
Austria.....	9
Switzerland.....	6
Russia.....	6
Italy.....	6
Sweden.....	4
England.....	4
Scotland.....	4
Ireland.....	2
France.....	2
Canada.....	1
Africa.....	1
Australia.....	1
Total.....	259

cases of abdominal Cesarean section for eclampsia. When this number was reached the polls were closed, so to speak, in order that the cases could be analyzed and conclusions drawn from such analysis. Otherwise the number could have been indefinitely augmented since at the present time the operation is far more frequently performed than was the case a few years ago.

As in the former paper no case was included in the list where there was not at least one distinct eclamptic seizure. This criterion was established not to emphasize the importance of the eclamptic convulsion but for the purpose of having some standard to go by. For obviously it would have taken us too far afield to include in the list cases where the operation had been performed for the toxemia of pregnancy.

The operators have been listed according to their nationalities and their published and unpublished cases also have been listed. It has been thought best to give the addresses of the individual operators as accurately as possible, as an aid to future investigators. Where it has been impossible to obtain the addresses, the article in which the case was reported can be found in the bibliography.

In spite of the fact that more than one-half of the cases, 276 out of 500, were performed by American operators, it is not safe to conclude that relatively abdominal Cesarean section is performed more frequently for eclampsia in this country than abroad since naturally my requests for unpublished cases were complied with more generally in this country. Germany, for instance, furnished over twice as many published cases as did America, 95 as against 46, yet only 33 unpublished cases were sent me by German operators.

Of especial interest is the fact that the 500 cases of abdominal Cesarean section for eclampsia represented the work of 259 operators. In other words, the operations were performed not by a few men with large clinical material to draw from and with the skill that comes from unusual opportunities but by many operators from many countries. This after all is a far better index of the value of an operative procedure for a certain condition than where many operations are confined to a few men whose results perhaps the average surgeon would have difficulty in equalling. For any line of treatment in eclampsia to be of any value must be within the reach of the great body of practitioners, since they see the eclamptic first and must either carry out the treatment or call in someone to do it for them.

The maternal mortality.

Since it is generally agreed that the interests of the mother take precedence over those of her child in a case of eclampsia, it seems fitting that the maternal mortality resulting from the series should be first considered. But I have come to the conclusion that in all fairness to any operative procedure in eclampsia, the mortality must be arrived at in such a manner as to show its true value. I mean by this that to-day we are only interested historically in the results obtained by abdominal Cesarean section for any obstetric

condition when the operations were performed before the days of asepsis or before obstetricians began to realize the operation under discussion could not be performed safely if prior attempts had been made to deliver by the natural passages.

Obstetrics in general and obstetric surgery in particular have been slow to respond to the great advances in surgical technic which have taken place during the past thirty years. It is a matter of common knowledge that the operator who is most painstaking in the aseptic technic of his abdominal and plastic work will be guilty of the greatest carelessness in his obstetric surgery. This lack of care is an undesirable inheritance from a host of obstetricians who were not trained in surgical technic, since their surgical experience was limited to this one field. While many deaths resulted from poor technic, so great was the natural resistance of the parturient woman that the mortality from sepsis did not reach alarming proportions so long as the operative procedures were from below, in other words, if the peritoneal cavity were not invaded. But it was another story when this happened. Then the mortality was very high, for the peritoneum, contaminated by puerperal septic organisms, became rapidly the seat of general inflammation and death resulted from peritonitis.

Since abdominal Cesarean section involves the opening of the peritoneal cavity it is obviously unfair to include in the mortality figures, except for comparison, patients operated by this method before the days of asepsis or before obstetricians realized the contraindications to the operation from the standpoint of sepsis. If such cases are included in the statistics, the figures do not show the results of the treatment of eclampsia by abdominal Cesarean section, but the results of such operative treatment plus sepsis which places the mortality far higher than it should be.

In addition, it must be understood that a small number of cases is of little avail so far as statistics are concerned. Results obtained from the treatment of a few cases may be far different when more patients are subjected to the same treatment. For this reason among others, I have waited before publishing results until conclusions could be drawn from hundreds and not dozens of cases.

For the reasons outlined above I have divided the 500 cases chronologically into two groups, first, those occurring prior to 1908 and second, those operated upon between 1908 and 1913. The latter period was selected only because it furnished the requisite number of cases from which to draw conclusions and for no other purpose.

Between 1908 and 1913 there were 283 cases of antepartum eclampsia where the uterus was emptied by abdominal Cesarean section

with 73 deaths or a maternal mortality of 25.79 per cent. During the first period, that is, up to 1908, there were 198 cases with 95 deaths or a mortality of 47.97 per cent. There were 29 cases of the 500 where the year of the operation was not given, therefore, so as to be absolutely accurate, these cases were omitted in making up the mortality figures. For the sake of completeness and comparison and for no other reason it may be well to state that in the 500 cases there were 174 deaths or a total mortality of 34.8 per cent.

Inasmuch as the value of the statistics in this paper depends upon the arrangement of the cases into groups from the standpoint of the date at which the operations were performed, further explanation in favor of the plan adopted may be necessary. Total mortalities obtained by collecting cases where operations were performed either before the advent of asepsis or where the latter was imperfectly carried out are of little value for us to-day. If we wished to obtain an accurate idea of the mortality of the removal of fibroids of the uterus by hysterectomy, either supravaginal or complete, we would not think of collecting operations from the literature performed during the time gynecologists were trying out different forms of operative technic. Statistics based upon such cases would be quite valueless, so far as our present day viewpoint is concerned. Of what value would be a statistical study of the mortality incident to the operation for appendicitis based upon a series of operations some of them performed in the days when we operated only as a last resort, or waited until an abscess had formed about the appendix?

It is absolutely necessary to study the results of operations by the group method, if great changes in operative technic have arisen during the period the cases in the entire series have occurred. Yet this seems to have been lost sight of in the statistical study of abdominal Cesarean section for eclampsia.

Routh has recognized the necessity of grouping chronologically cases of abdominal Cesarean section performed for different obstetric conditions. He collected 1282 cases of this operation performed by obstetricians and gynecologists of the United Kingdom who were living June 1, 1910. He was able to collect in all 1058 cases of abdominal Cesarean section for contracted pelvis with a mortality of 9.7 per cent. Up to 1891 there were 26 cases with a mortality of 30.7 per cent. while from 1906 to 1910 (uncompleted five years) there were 602 cases with a mortality of 6.1 per cent. Thus if the cases had not been grouped, the mortality for abdominal Cesarean section for contracted pelvis would have stood at 9.7 per cent., while with present day methods it is 3.5 per cent. lower. It also follows the

greater the number of cases in the earlier periods, the higher the total resultant mortality will be, hence the greater the error.

So far as I have been able to observe all mortality statistics of abdominal Cesarean section for eclampsia have almost without exception been made without regard to when the operations were performed, hence are valueless so far as furnishing us with a correct valuation of the operation, as it stands to-day, is concerned. Routh is no exception to the rule, for while recognizing the necessity for the grouping system as regards his own statistics, he quotes Kettlitz as having collected 28 cases with 14 deaths, Hillman 40 cases with 21 deaths, Streckeisen 26 cases with 8 deaths. The total mortality of the operation in eclampsia in 105 cases was 47.6 per cent. By his own reasoning this mortality must be too high, how much too high could only be ascertained by grouping the cases he quotes.

"Moran collected 116 cases of abdominal Cesarean section from the literature with a maternal mortality of 48.9 per cent. He tries to rectify this unquestionably excessive mortality by grouping 53 cases occurring from 1901 to 1911 with a maternal mortality of 32.32 per cent. But he failed to realize what I have already pointed out that obstetric surgery and especially abdominal Cesarean section has not advanced as rapidly as have other departments of surgery. Only within the past five years has it begun to dawn upon the mind of the obstetric surgeon in general that we cannot remove the child by the suprapubic route without a high maternal mortality if attempts have been made to deliver from below or even if many vaginal examinations have been made."

I have been rather insistent upon explaining the necessity of the group method of making up mortality statistics since totally erroneous figures are quoted by those who oppose the operative treatment of ante-partum eclampsia. Zinke, for instance, quotes Moran's 32.32 per cent. mortality and says "if this is advancement, the writer fails to see it." The same writer quotes Routh as reporting seven cases of Cesarean section for eclampsia with four deaths or a mortality of 57 per cent. and then adds "Think of it." The great trouble is the lack of thinking going on all the time in regard to mortality statistics. Zinke might just as well have picked out a single case report where death followed the operation and asked us to think of a 100 per cent. mortality. What has the mortality resulting from seven cases to do with any question? When will we learn that statistics made up from less than one hundred cases of any condition must be quoted with reservations?

Dr. Zinke is impressed with the importance of the results of his last thirty cases of eclampsia treated medicinally with a maternal mortality of 13.3 per cent. Such results are to be commended because so many mothers out of the thirty lived but the series is rather small to be of great importance in determining the value of any kind of treatment. His next thirty cases may show very different results. A small number of cases can be used to prove almost anything. By using this method Zinke's claim to the superiority of medicinal over operative treatment of eclampsia could be overthrown at once by statistics furnished by one operator in my own series, (Table I) who had 14 abdominal Cesarean sections for eclampsia with one death or a maternal mortality of 7.14 per cent.

TABLE I.
LIST OF OPERATORS WHO HAVE HAD FIVE OR MORE CASES OF
ABDOMINAL CESAREAN SECTION FOR ECLAMPSIA
FROM 1908 TO 1913

Operators	Cases	Recoveries	Deaths	Mortality, percentage
Brown, D. J.....	10	8	2	20.00
Burns, T. M.....	7	7	0	.....
Davis, A. B.....	9	5	4	44.44
Henkel, M.....	5	2	3	60.00
Ill, C. L.....	9	9	0	.....
Ill, E. J.....	5	5	0	.....
Johnston, W.....	5	4	1	20.00
MacLean, H. S.....	5	5	0	.....
Markoe, J. W.....	6	3	3	50.00
Michailoff, N.....	5	5	0	.....
Mullally, L.....	6	4	2	33.33
Nason, F. T.....	14	13	1	7.14
Williams, E. M.....	5	4	1	20.00
	91	74	17	18.68

Still one would hardly claim this to be the average mortality of eclampsia treated by abdominal Cesarean section.

In a previous article certain figures were given of the results of the five operators sending in the largest number of cases (9.5 per cent. mortality in forty-two cases) and the mortality of 120 cases furnished by twenty operators having five cases or more. Since these figures were published it has been found that some of these twenty

operators had been credited with cases in reality performed by others but reported by them in correspondence. The corrected list is given in Table I and shows that during the period from 1908 to 1913 thirteen men performed five or more abdominal Cesarean sections for eclampsia. In all there were ninety-one cases with seventeen deaths or a maternal mortality of 18.68 per cent. This is a remarkable showing for a series numbering nearly one-fifth of the entire series of 500 cases.

A study of Table I also shows that the mortality records of the different operators vary from no mortality at all up to 60 per cent., always keeping it clearly in mind that the percentages are made up from a small number of cases. I have no means of knowing the condition of Henkel's and Mullally's patients before operation but Davis has explained the reason for the high mortality in his and Markoe's cases at the New York Lying-In Hospital by saying that their material was made up of many moribund and septic patients. As I shall show later abdominal Cesarean section for eclampsia is contraindicated under these conditions. Deducting the fifteen cases of these two operators we have seventy-six cases with ten deaths or a maternal mortality of 13.15 per cent., by a curious coincidence a fraction of a per cent. less than that quoted by Zinke for his thirty cases treated medicinally.

I am fully aware of the danger of drawing conclusions from such a small number of cases, although the number is over twice as large as that quoted by Zinke. I am also aware that there is danger in excluding cases for apparently good and sufficient reasons, hence I have been careful to explain just how and why such exclusions were made and have refrained from drawing conclusions. Still the series in whole or in part is interesting as showing the results of abdominal Cesarean section for eclampsia in the hands of men who have had experience with the operation under consideration.

While 25.79 per cent. cannot be considered a low maternal mortality for the treatment of eclampsia, it is surprisingly low for abdominal Cesarean section in this complication of pregnancy. Any operation carrying with it a 40 or 50 per cent. mortality would only be persisted in because of urgent necessity, never as a matter of choice. If, however, the figures stand at 25 per cent. with every prospect of being still further reduced if certain features making for a high mortality can be eliminated, abdominal Cesarean section at least must be given a respectful hearing as a treatment of certain cases of eclampsia provided operative treatment is to be employed.

Later, certain facts will be brought forward explanatory of the high mortality (25.79 per cent.) attendant upon this operation, that is, high as compared with other methods of treatment. Now I merely wish to emphasize the fact that the old mortality figures of this operation for eclampsia are incorrect.

In another article I have proved the advantages of operative delivery in eclampsia over medicinal treatment and spontaneous labor. In 200 cases of eclampsia occurring between 1900 and 1912 where the patients were delivered spontaneously the maternal mortality was 18.96 per cent., while in 1496 cases treated by operative delivery during the same period the maternal mortality was only 14.8 per cent., an advantage of 4 per cent. in favor of operative delivery.

Just as in the vaginal Cesarean series undoubtedly the present abdominal Cesarean series contained a very large proportion of desperate cases, otherwise such a serious and rather unusual operative procedure for this condition would not have been undertaken. For this reason many patients were operated upon who were doomed no matter what treatment was instituted. I am confirmed in this belief by the good results obtained by the few men who were inclined to broaden the indications for the operation, emptying the uterus by this method whenever the woman was having convulsions. I am not saying that this is a justifiable treatment for antepartum eclampsia. I am simply stating why possibly one-quarter of the women died after the operations, namely, that the operations were performed in many instances upon desperately sick women so profoundly affected by the eclamptic toxin that death resulted in spite of treatment.

The relation between emptying the uterus and the cessation or continuation of convulsions.

Let it be clearly understood that the condition of the eclamptic can only be judged in a general way by the number and severity of the convulsions. It is fully realized that an eclamptic can die after a single or survive after many convulsions. Again there may be a true eclampsia without a convulsive seizure. Yet in spite of these exceptions to the rule we have in the convulsions a fairly good index of the degree of intoxication present. By virtue of the fact that the pregnant woman has had a convulsion, we judge her condition to be one of eclampsia and her case entitled to consideration in a series of eclamptic cases. The more violent the convulsions, the more frequent their recurrence and the more the patient is subjected to, other things being equal, the greater the eclamptic intoxication and

the more serious the condition of the patient. Hence until some better method of estimating the condition of the eclamptic be shown we are forced to lay great stress upon the convulsions as an index of the extent of the eclamptic poisoning.

In the vaginal Cesarean series 2135 cases of eclampsia were analyzed in regard to the cessation of convulsions after delivery. These cases included patients with spontaneous and operative delivery and showed that convulsions ceased after the uterus was emptied in 52.7 per cent. of the cases. A study of 247 cases where delivery was spontaneous showed cessation of convulsions in 59.5 per cent., while in 994 cases after operative delivery the convulsions ceased in practically the same percentage of cases (59.4). In 453 cases of vaginal Cesarean section for eclampsia the convulsions ceased in 62.6 per cent. of the cases. From this it was concluded that it made very little difference as regards the cessation of convulsions whether the delivery ended spontaneously or was terminated by operative means.

In the present series of cases of abdominal Cesarean section for eclampsia there were 457 cases where data regarding the continuation or cessation of convulsions after the operation were available. In 251 of these 457 cases or in 54.92 per cent. the convulsions ceased after the uterus was emptied, these figures corresponding to the other figures quoted, 52 to 62 per cent. of cessation of convulsions after the uterus is emptied either spontaneously or by artificial means.

Apparently there is still considerable confusion regarding the entire question of the cessation or continuation of convulsions after the uterus of the eclamptic is emptied. The subject is rather a complex one and not so easily settled as might at the first glance be supposed. As has been stated, the convulsions in a general way indicate the amount of the eclamptic poisoning present in a given case, with the exceptions noted. Emptying the uterus and thereby removing the condition giving rise to the toxemia of pregnancy would surely put a stop to this toxemia if performed at the very beginning of the elaboration of the poisons. No one would question the truth of this statement. However, if the toxemia continues up to the point where the maternal organism reacts in the form of an eclamptic convulsion, emptying of the uterus either spontaneously or by artificial means, while it puts a stop to further elaboration of toxins from the fetus, placenta or both may not be sufficient to prevent further convulsions or in certain cases death of the mother from an intoxication which was present prior to the delivery. In other words, the patient either has one or more convulsions after

delivery and recovers or dies from the eclamptic intoxication in spite of the relief afforded by emptying the uterus.

As a matter of fact too much stress must not be laid upon the cessation or continuation of convulsions after any form of treatment of eclampsia. For the reasons stated above the convulsions will cease only in a little over one-half the cases no matter what form of treatment be employed. Lichtenstein who claims very favorable results in a small number of cases of eclampsia where venesection was employed thinks the cessation of the convulsions in 59 per cent. of the cases to be due to the treatment employed. If this claim be valid how does he explain the cessation of the convulsions in the vaginal Cesarean series in 62.6 per cent. of the cases after delivery by operative means? In order to answer the question why the convulsions did or did not cease in the two series of cases we would have to be in a position to state the degree of intoxication in each individual eclamptic, a question, so far as the convulsions are concerned either before or after delivery, we are in no position to answer by present-day methods.

The relation between the cessation of convulsions and the maternal mortality.

Another proof that the cessation or continuation of the convulsions after delivery is only of relative importance in judging of the condition of the eclamptic is seen in the mortality figures in the two classes of cases. If it were the whole story we would judge that the victory had been won if the convulsions ceased but we know this to be untrue.

The maternal mortality in 251 cases in the present series where the convulsions ceased after delivery was 27.8 per cent. against a total mortality in the whole series of 34.8 per cent. By the grouping system we find that up to 1908 in 105 cases where the convulsions ceased there were 41 deaths or a mortality of 39.04 per cent., while in 146 cases occurring between 1908 and 1913 there were 29 deaths or a maternal mortality of 19.8 per cent. as against a total mortality during this period of 25.79 per cent.

If the cases where the convulsions continued after delivery be considered it will be found that up to 1908 in 76 cases there were 38 deaths or a mortality of 50 per cent. while in 130 cases between 1908 and 1913 there were 41 deaths or a maternal mortality of 31.53 per cent.

Seitz's cases together with the cases of my two series have been arranged in a table as follows:

TABLE II.
MATERNAL MORTALITY IN RELATION TO THE CESSATION OR
CONTINUATION OF THE ECLAMPTIC CONVULSIONS

	Cessation of convulsions			Continuation of convulsions		
	Number of cases	Deaths	Mortality, percentage	Number of cases	Deaths	Mortality, percentage
Seitz.....	123	25	20.3	102	22	21.5
Peterson (vaginal Cesarean).	284	50	17.6	169	54	31.9
Peterson (abdominal Cesarean) 1908-1913	146	29	19.8	130	41	31.5
Total.....	553	104	18.8	401	117	28.1

Thus it may be seen that the analysis of the cases of the present series gives weight to the conclusion set forth in the first paper that the fact that convulsions cease after delivery does not mean that the patient will recover, since under these circumstances about 20 per cent. die; however, it may be said that when the convulsions cease the patient stands a much better chance of recovery since the mortality is 10 per cent. higher when the convulsions continue after the uterus is emptied.

The variations in maternal mortality dependent upon when the uterus is emptied in relation to the convulsions.

In my opinion no form of operative treatment of eclampsia has been given a fair trial. If our reasoning has been correct, emptying the uterus will prove advantageous, provided the treatment be instituted early, before the maternal and fetal organisms are overwhelmed by the eclamptic poison. If the operative treatment be delayed through injudicious attempts to cure the patient by medicinal means while the toxins are being elaborated by virtue of the continuation of the pregnancy, the results of such treatment must necessarily be rendered poor in proportion to the amount of the delay. Until this is clearly appreciated the best results will not be obtained from operative treatment. The position of those who advocate the medicinal treatment of eclampsia is absolutely untenable. They are simply repeating for the treatment of eclampsia arguments long since shown absolutely incorrect as regards other forms of treatment. For example, one has only to recall the history of the treatment of ectopic pregnancy to be convinced of the truth

of this statement. In the early days of the treatment of this condition all kinds of therapy were suggested, electricity and injection of the gestation sac with various poisonous substances in order to kill the fetus, in fact anything and everything to avoid the only rational treatment, the removal of the ectopic sac by operation. In this condition, temporizing and trying all kinds of treatment except the right one cost many lives. Once the surgical treatment was established upon a proper basis, the mortality was reduced to below 5 per cent., even including desperate cases.

The advice of those who urge the medicinal treatment of eclampsia while the woman is undelivered is irrational as a working rule. Certainly it does not give the operative treatment of eclampsia a fair show, for its advocates say, "use every means except surgical in antepartum eclampsia and then if the fight is going against you empty the uterus." There can be only one result of such delayed operation, a high maternal and fetal mortality.

While the number of antepartum convulsions may not be an exact index of the patient's condition, in a general way they do furnish this information. The chances of an eclamptic with one convulsion are infinitely better than are those of the patient who has had twenty-five. But it is a mistake to endeavor to compile statistics from what follows a certain number of convulsions. Especially is this true if we are dealing with a small number of cases. For instance, it was a mistake in my former article to give the mortality percentages separately after from one to ten convulsions. Immediately the eye took in the fact that the table showed that the maternal mortality where the operations were performed after the first convulsion was 18.51 per cent. while in fourteen cases where the operations were performed after the ninth convulsion the mortality was only 7.14 per cent. Although this was explained in the text, the explanation counted for little.

The convulsions in relation to the maternal mortality have been considered in two large groups, first, all the cases between 1908 and 1913 arranged according to whether the operations were performed after from one to five convulsions or after from six or more convulsions. The second group has been worked out in a similar manner as regards the time after the convulsions the operations were performed but has also been arranged according to whether the convulsions ceased or continued after the operations.

(a) There were 213 cases in the first group. Of these there were 124 operations after from one to five convulsions with twenty-five deaths or a maternal mortality of 20.32 per cent. This is an ex-

ceedingly low mortality from an operative procedure which has been thought to carry with it a death rate of nearly 50 per cent. It will be noticed that the mortality is 5 per cent. lower where the operations have been performed after a few convulsions than where there has been delay in emptying the uterus.

If to this immediate emptying of the uterus or at least its emptying shortly after the onset of the convulsions be added noncontamination of the puerperal tract from below by the avoidance of or limitation of vaginal examinations or attempts at delivery, a maternal mortality is found which more nearly represents what should be accomplished by the suprapubic route. For out of the 124 operations there were sixty where no or only one or two vaginal examinations were made and where no attempts were made to deliver from below. There were only nine deaths after these sixty operations or a maternal mortality of 15 per cent. Granting this to be a small number of cases, as far as they go they indicate that in clean cases with clean surgery, performed after a few convulsions the maternal mortality compares very favorably with other forms of eclamptic treatment. Also it holds out a hope that under equally favorable circumstances the same or even better results can be obtained in a larger number of cases.

I have no argument with those who attempt to explain such figures by saying that a large proportion of such operations were probably useless and that many of the patients would have recovered without them. Such statements are as worthy of notice as would be the suggestion that probably the drugs used in the medicinal treatment of eclampsia were inert and therefore might just as well not have been administered. The point is that the patients were eclamptics as shown by the convulsions and other symptoms and that they recovered after the uterus was emptied by the suprapubic route. This does not mean that every woman with eclampsia should be subjected to the same treatment or that equally good results may not be obtained by other methods. That is another question altogether and must be considered separately. But nothing is gained by trying to explain a mortality by suggestions which do not explain and besides are foolish in the extreme.

The increase in mortality due to delay is shown by the fact that in eighty-nine eclamptics where the operations were performed after the sixth convulsion there were twenty-seven deaths or a mortality of 30.33 per cent. This is 10 per cent. higher than after quick delivery and 5 per cent. higher than the total mortality during this same period.

(b) Where there is a cessation of convulsions after the uterus has been emptied the presumption is that the patient is in better condition than where the convulsions continue, although, as we have seen, death occurs in a certain percentage of these cases. But these deaths may have occurred from delay in operating even if no convulsions follow. This is shown by the fact that in sixty cases where there was a cessation of the convulsions after the operations where the latter were performed after from one to five convulsions, there were eight deaths or a maternal mortality of 13.33 per cent. In fifty-two cases under the same conditions except that the convulsions continued there were fourteen deaths or a mortality of 26.92 per cent. We are forced to the conclusion then that this double as high mortality was due to the fact that even with immediate operation after the onset of the convulsions the patients were so toxic that death followed in spite of operative treatment.

Where the abdominal Cesarean sections were performed after more than five convulsions in thirty-eight cases there were ten deaths or a mortality of 26.31 per cent. where there were no convulsions after the operations. In forty-four cases under the same conditions except that the convulsions continued there were sixteen deaths or a mortality of 36.36 per cent.

Miscellaneous Statistics Relating to the Convulsions.—For the sake of completeness and for comparison with the data submitted in the vaginal Cesarean paper certain statistics have been arranged in the following tables. Only those cases could be used where definite statements were made regarding the convulsions before and after the abdominal Cesarean sections.

TABLE III.
AVERAGE NUMBER OF CONVULSIONS IN ANTE-PARTUM
ECLAMPSIA UNDER DIFFERENT CONDITIONS WITH
ABDOMINAL CESAREAN SECTION

	Number of cases	Average number of convulsions	Average number of convulsions before operation	Average number of convulsions after operation
Patients where number of convulsions was given.	386	9.0	7.0	2.0
Patients recovered.....	258	8.0	6.1	2.0
Patients died.....	128	11.4	7.7	3.9
Primiparæ.....	322	9.3	6.9	2.7
Multiparæ.....	59	7.9	5.7	2.2
Twin pregnancies.....	17	7.3	6.3	1.2

In table III the cases have been grouped irrespective of the period in which the operations were performed. As would be expected, the average number of convulsions was much less where the patients recovered. Lichtenstein emphasizes the fact that by the venesection treatment of eclampsia the average number of convulsions has been reduced from an average of 13.5 per patient as given by Glockner in 400 cases to 5.1 per patient in his 39 cases. Seitz's average number was 8 while Büttner's was 10. The average number per patient in the vaginal Cesarean series was 8 while in the present series in 386 cases the average was 9 per patient.

Too much importance should not be placed upon the increase or decrease in the number of convulsions per patient in a given series of cases where a certain line of treatment has been pursued. A great many factors, like delayed treatment, medicinal or operative, the kind of treatment employed after delivery etc., tend to make the subject very complex and to warn us not to place too much importance upon the average number of convulsions.

TABLE IV.
AVERAGE NUMBER OF CONVULSIONS IN ANTEPARTUM
ECLAMPSIA UNDER DIFFERENT CONDITIONS UP TO
1908 AND FROM 1908 TO 1913

	Up to 1908				1908-1913			
	Number of cases	Average number of convulsions	Average number of convulsions before operation	Average number of convulsions after operation	Number of cases	Average number of convulsions	Average number of convulsions before operation	Average number of convulsions after operation
Patients where number of convulsions was given	138	10.0	8.0	2.0	242	8.0	5.0	3.0
Patients recovered.....	76	9.2	8.0	1.6	182	7.2	5.3	2.0
Patients died.....	62	11.0	8.6	2.7	59	11.7	7.1	4.8
Primiparæ.....	115	10.5	8.6	2.3	192	8.6	5.9	2.9
Multiparæ.....	18	9.0	7.0	2.4	40	7.0	5.2	2.2
Twin pregnancies.....	7	10.1	7.9	2.1	9	5.2	4.5	0.8

The cases have been grouped according to periods in Table IV for the purpose of comparison. It will be seen that on the whole the figures in the cases occurring during 1908 to 1913 are decidedly lower

than in the cases occurring before 1908. This is what could be expected and undoubtedly is due to prompter delivery and better operative technic.

TABLE V.
FREQUENCY OF MULTIPLE PREGNANCIES IN ECLAMPSIA

	Number of cases	Twins	Percent- age	Triplets	Percent- age
Esch.....	496	19	3.8	.....	.....
Glockner.....	147	9	6.1	I	.....
Goedecke.....	403	19	4.7	I	.....
Goldberg.....	81	4	4.9	.....	.....
Olshausen.....	200	16	8.0	.....	.....
Peterson (vaginal Cesarean)...	530	17	3.2	.....	.....
Peterson (abdominal Cesarean)	500	21	4.02	.....	.....
Schauta.....	342	27	7.8	.....	.....
Zweifel.....	83	5	6.0	I	.....
	2782	137	4.9	3	.13

Table V has been made up from Table XI of the vaginal Cesarean article by the addition of the number of twin pregnancies in the present abdominal Cesarean series. It will be seen that twins occurred twenty-one times in the 500 cases or in 4.02 per cent. This was more frequent than in the 530 cases of vaginal Cesarean section, although not quite as frequent as in the 2782 cases of eclampsia (4.9 per cent.). This is in the proportion of a twin pregnancy to about every twenty-four cases of eclampsia, relatively over three times as frequent as are twins in normal cases.

The Fetal Mortality after Abdominal Cesarean Section for Eclampsia.—It is to be expected that the fetal mortality from the treatment of eclampsia by abdominal Cesarean section would be less than from any other operative procedure. By this method the child is lifted from the uterus, thereby escaping all trauma resulting from spontaneous or operative delivery through the natural passages. Were it not for the fact that the fetus receives but little consideration in the treatment of this grave complication of pregnancy, there would be more of a place for the abdominal operation on the ground that it gives the fetus the best chance for life. But in practice the child is still apt to be disregarded and all efforts bent on saving the mother. While there are good scientific grounds for this attitude on the part

of the obstetrician, for even if the child be saved primarily there are many chances of its dying later, there is no gainsaying the fact that if the results of abdominal Cesarean section for eclampsia were to be shown equal to other good methods of treatment, its superiority, so far as the fetal mortality is concerned, would make it the operative treatment of choice.

I cannot do better than to quote from my former article the reasons for the method adopted in the two series of cases for estimating the value of the operative treatment so far as the fetus is concerned.

"Obviously, it is unfair in the estimation of the value for the fetus of any form of treatment in eclampsia to include cases where the period of gestation is so early as to preclude any hope that the child may live after artificial or spontaneous delivery. Hence certain exclusions must be made. Just what these shall be is necessarily somewhat arbitrary, but if stated as a preliminary to the statistics, the results give an approximately correct idea of the fetal mortality. In estimating the fetal mortality the following rules were observed:

1. All children weighing less than 2000 grams up to the eighth month were judged to be premature and were not counted whether they lived or died.
2. No child was included, who was known to be dead at the time of the operation.
3. If a child lived an hour or more after delivery it was counted as living, if less than an hour it was included among the deaths."

It may be said regarding these rules that a child might live an hour and then die, either within a few hours or a few weeks, hence an hour is too short a time to select. A little consideration will show that very little weight should be given to this criticism, since the child is liable to perish at any time during the first few hours, weeks or months of its life. The criticism would apply equally well if twenty-four hours or a week or four weeks were chosen. At the expiration of an hour after its birth it has been decided definitely whether a child is to live or whether it is to be stillborn. So this might just as well be selected as a criterion as a subsequent hour or day.

However, in all fairness it must be stated that all fetal mortality statistics have not been made upon this basis, hence this fact must be taken into consideration in comparing the different results. A great deal of confusion would be saved if some sort of standard could be adopted, or at least if each author would state under what conditions he judged a child to have lived or died after the delivery.

As an aid to the comparison of the present fetal statistics with

those made under different standards certain statistics have been worked out in Table VI in which all children dying within the first three days after the deliveries have been counted among the deaths. Other causes beside the eclampsia or the operation may have caused these deaths but they are given for the reason stated and may be taken for what they are worth.

From 1908 to 1913 there were 248 children delivered by abdominal Cesarean section with 9 deaths or a fetal mortality of 3.62 per cent. Up to 1908 there were 133 cases with 16 deaths or a fetal mortality of 12.03 per cent. Thus it will be seen that the fetal mortality in the first period was almost four times as great as that during the five-year period, from 1908 to 1913.

TABLE VI.
FETAL MORTALITY IN ECLAMPSIA UNDER VARIOUS METHODS

	Number of children	Deaths	Mortality, percentage
Various methods.....	1478	460	31.1
Vaginal Cesarean section (living one hour).....	315	67	21.2
Abdominal Cesarean section (up to 1908; living one hour).	133	16	12.03
Abdominal Cesarean section (up to 1908; counting children dead who died first few days after delivery).	130	32	24.61
Abdominal Cesarean section (1908-1913; living one hour).	248	9	3.62
Abdominal Cesarean section (1908-1913; counting children dead who died first few days after delivery).	243	26	10.69
Abdominal Cesarean section (up to 1908; after 1-5 convulsions).	40	3	7.50
Abdominal Cesarean section (1908-1913; after 1-5 convulsions).	118	3	2.54
Abdominal Cesarean section (up to 1908; after 6 or more convulsions).	49	13	26.52
Abdominal Cesarean section (1908-1913; after 6 or more convulsions).	76	6	7.89

Various interesting facts besides those statistics above regarding the fetal mortality after abdominal Cesarean section for eclampsia have been arranged in Table VI. Just as the maternal mortality was lowest when the uterus was emptied early after the first con-

vulsion, so the lowest fetal mortality (2.54 per cent.) occurred in the period from 1908 to 1913 where the operations were performed after from one to five convulsions, that is, under good technic and before the child as well as the mother was overwhelmed by the eclamptic toxin. Faulty technic probably accounted for double this mortality up to 1908 for in both groups of cases the operations were performed equally early.

The highest fetal mortality (26.52 per cent.) was found in 40 cases where the operations were performed before 1908 and after six or more convulsions. Even in the five-year period the fetal mortality is high (7.89 per cent.) compared with the 2.54 per cent. mortality obtained through prompt operating and good technic.

Zinke in 30 cases of eclampsia reports a fetal mortality of 50 per cent. Lichtenstein after certain exclusions had a fetal mortality of 25 per cent. in 50 children born after the venesection and narcotic treatment. After various methods of delivery with some exclusions in 1487 cases there were 460 children died or a fetal mortality of 31.1 per cent. After vaginal Cesarean section the fetal mortality was 21.2 per cent. In the light of such figures the obstetrician is bound to consider the rights of the fetus when by a certain operation the fetal mortality can be reduced to 2.54 per cent. with a maternal mortality in 60 cases of 15 per cent.

The Relation between Primi- and Multigravity and Eclampsia.—Out of 500 cases of abdominal Cesarean section there were 474 cases where it was definitely stated whether the woman was a primipara or multipara. Of these 397 or 83.75 per cent. were primiparæ while 77 or 16.17 per cent. were multiparæ. This is a larger proportion of primiparæ than was the case in the vaginal Cesarean section series where 73.1 per cent. of 517 eclamptics were primiparæ. In 3134 cases of eclampsia collected in reference to this point (see Table VII) it was found that 75 per cent. of the eclamptics were primiparæ. Probably the greater proportion of primiparæ in the present series was due to the fact that primiparous conditions such as undilated and rigid cervix and rigidity of the soft parts more often called for the abdominal operation than for other methods of delivery.

It was found in the former investigation that the maternal mortality was higher among the multiparæ than with the primiparæ. In the 3134 collected cases it was 28.4 per cent. in the 771 multiparæ, while it was 22.35 per cent. or lower by 6 per cent. among the primiparæ.

TABLE VII.
PRIMIPARÆ AND MULTIPARÆ IN ECLAMPSIA
(Table XV in Vaginal Cesarean Article)

Author	Total number of cases	Primiparæ				Multiparæ			
		Number of cases	Percentage of cases	Number of deaths	Percentage of mortality	Number of cases	Percentage of cases	Number of deaths	Percentage of mortality
Büttner.....	507	350	69.0	77	22.0	157	31.0	52	33.0
Esch.....	496	385	78.3	82	21.3	107	21.7	24	22.4
Glockner.....	147	116	80.0	23	19.8	29	20.0	3	10.3
Goedecke.....	403	304	75.4	47	15.5	99	24.6	21	21.2
Goldberg.....	81	70	86.4	15	21.4	11	13.5	5	45.4
Hammerschlag...	291	198	68.0	45	23.0	93	32.0	30	32.0
Löhlein.....	103	88	85.4	18	20.5	15	14.6	5	33.3
Olshausen.....	200	145	75.0	34	23.7	51	26.0	17	33.3
Peterson.....	517	378	73.11	81	21.4	139	26.8	37	26.7
Schauta.....	306	353	82.6	93	37.3	53	17.4	24	44.8
Zweifel.....	83	66	79.5	11	16.6	17	20.4	1	5.5
Total.....	3134	2353	75.08	526	22.35	771	24.6	219	28.4

In the present series in, 225 primiparæ where the abdominal Cesarean sections were performed from 1908 to 1913 the maternal mortality was 24.44 per cent. while in 48 multiparæ during the same period the mortality was 27.08 per cent.

The fetal mortality was also higher during the same period among the children of multiparous mothers. In 203 children of primiparæ the fetal mortality was 3.44 per cent. while in 44 children from multiparous mothers the fetal mortality was 4.54 per cent.

I have no reason for changing the conclusions arrived at from a study of this part of the subject in the former article. In fact these conclusions are strengthened by the above figures, since the children of both primiparæ and multiparæ because they were removed by the abdominal route escaped the traumatism of labor. Hence the high fetal mortality in the children of multiparæ must be due to the greater intoxication in the multiparous as compared with the primiparous mothers.

Also we see no reason for changing our conclusions that the higher mortalities, both maternal and fetal, among the multiparæ may be

ascribed to the ages of the latter. Naturally they are older than the primiparæ and once the victims of eclampsia, less able to withstand its resulting poisoning. For the sake of completeness it may be stated that the average age of the 397 primiparæ was 24.6 years while that of the 77 multiparæ was 32.6 years.

The Relation between Age and the Eclampsia.—In a general way while the mortality percentages bear out the above statements regarding the influence of the age of the eclamptics upon the degree of intoxication present, there was not as much regularity as shown in the vaginal Cesarean section series. During the five-year period there were 55 eclamptic patients between the ages of 16 and 20. The maternal mortality was 23.63 per cent. Between the ages of 31 and 35 there were 45 patients with 14 deaths or a mortality of 31.11 per cent. while in 14 cases where the patients' ages ranged from 41 to 46 there were 6 deaths or a mortality of 42.85 per cent.

The age of the youngest patient was 12 and that of the oldest 46. The average age of 448 patients was 26.6.

The Period of Gestation in its Relation to Eclampsia.—The period of gestation was given in 465 out of 500 cases. These cases are arranged in Table VIII so as to show the percentage of cases at the different periods of gestation.

TABLE VIII.
CASES OF ECLAMPSIA ARRANGED ACCORDING TO PERIODS OF GESTATION

Period of gestation	Number of cases	Percentage of cases
Fifth month.....	1	0.21
Sixth month.....	5	1.07
Sev nth month.....	40	8.60
Eighth month.....	86	18.49
Ninth month (full term).....	333	71.61

Naturally the largest number of cases occurred at the ninth month or full term because abdominal Cesarean section was more often indicated at that period of gestation as the easiest and quickest method of delivering the patient. However, this is not the only reason for the prevalence of eclampsia in the later months of pregnancy, since Glockner, Goedecke and others have shown that it is much more common in patients at the eighth or ninth months of gestation. More than one-half (56.3 per cent.) of the vaginal Cesa-

rean sections were performed at full term. Just as in that series there was no case of eclampsia prior to the fifth month in the present series and the number of cases increased from that period up to full term.

TABLE IX.
PERIOD OF GESTATION AND MATERNAL MORTALITY IN
ECLAMPSIA (1908-1913)

Period of gestation	Number of cases	Deaths	Mortality, percentage
After thirty-second week	192	44	22.91
Twenty-fifth to thirty-second week	77	22	28.57
Below twenty-fifth week	5	3	60.00

In Table IX the cases have been arranged according to periods of gestation and maternal mortality. Just as in the vaginal Cesarean series it is found that the further advanced the pregnancy the lower the maternal mortality. While the number of cases below the twenty-fifth week is too small to be of much value from a statistical standpoint, the number of cases at the other periods of gestation is large enough to draw conclusions from.

Operative Procedures Prior to Abdominal Cesarean Section.—The operations performed prior to the vaginal Cesarean sections were listed and the 5 per cent. higher mortality in the patients upon whom these operations were performed attributed to the delay with its increased maternal and fetal intoxication. Quite a few of the deaths could have been caused by sepsis which not infrequently arises from prolonged and unsuccessful attempts at delivery from below. But as already pointed out the danger from sepsis is much less than in abdominal section after prior operative procedures, since in the vaginal operation the peritoneal cavity is opened only accidentally. In fact so great is the increased risk of a fatal result following abdominal Cesarean section for any condition where prior attempts have been made to deliver from below, that it is questionable whether the abdominal operation is ever justifiable under these circumstances. Certainly it is contraindicated unless the operator can be absolutely sure of the technic previously employed. Otherwise craniotomy would be a far preferable procedure. The true situation is probably not fully grasped by operators in general else we would not be confronted with the following list of operative procedures attempted prior to the abdominal Cesarean sections.

TABLE X.
OPERATIVE PROCEDURES PRIOR TO ABDOMINAL
CESAREAN SECTION

	Number of cases
Attempted vaginal Cesarean section	4
Bougie.....	3
Colpeurysis.....	1
Dilatation.....	11
Dilatation and bougie	1
Dilatation with bags.....	4
Dilatation with metal dilators and with fingers.....	1
Dührssen incisions.....	1
Forceps.....	7
Forceps and version.....	1
Hegar's dilator and colpeurynter.....	1
Manual dilatation.....	11
Manual dilatation and forceps.....	2
Manual dilatation and puncture of membranes.....	1
Metreurynter.....	1
Tamponade of cervix.....	1
Version and perforation.....	2
Total.....	53

In twenty-nine cases where various operative procedures were undertaken from below from 1908-1913 there were 10 deaths or a maternal mortality of 34.48 per cent. This high death rate as compared with the total death rate (25.79) during the same period was due principally to sepsis although shock and delay may have contributed their share to the results.

Vaginal Examinations Prior to the Abdominal Cesarean Sections and the Maternal Mortality.—It is exceedingly difficult to obtain from published cases or from a questionnaire accurate information regarding possible contamination of the genital tract through vaginal examinations. Routh's analysis of abdominal Cesarean section cases has shown the danger of frequent examinations or attempts at delivery since the maternal mortality under these conditions is 34.3 per cent. in comparison with 2.9 per cent. where the operations have been performed when the patients were not in labor and the membranes unruptured. But it is too much to expect that any great proportion of eclamptics will be subjected to abdominal Cesarean section without first being subjected to thorough pelvic examination, nor would this be desirable. In the great majority of cases eclampsia comes suddenly without warning and without previous knowledge of the size of the bony pelvis or of the soft parts. Hence at least one vaginal examination is almost always necessary.

Again, it is impossible to ascertain from a questionnaire the manner in which the vaginal examinations were made. It is perfectly possible to make a number of such examinations in accordance with an aseptic technic so perfect as to be almost without danger. On the other hand it is equally possible to infect the woman through a careless technic by one vaginal exploration.

In 188 cases during the five-year period it was recorded that one or more vaginal examinations were made. There were fifty-five deaths among these patients or a maternal mortality of 29.25 per cent. distinctly higher than the total maternal mortality (25.79 per cent.) during this period. Again combining the few cases where it was distinctly stated that no vaginal examinations were made with those cases where no statement was made, ninety-five cases in all, we find there were eighteen deaths or a maternal mortality of 18.94 per cent.

As far as this evidence goes we are justified then in concluding that a certain proportion of the deaths during the five-year period were due to prolonged or badly conducted vaginal examinations with the understanding that such examinations would have been productive of far less mortality had not the peritoneal cavity and the uterus been opened subsequently.

Indications for the Abdominal Cesarean Sections for Eclampsia.—In sixty-eight of the 500 cases no statement was made as to why the abdominal Cesarean sections were performed. The indications for the remaining 432 operations have been listed in Table XI.

It is unfortunate that the indications have not been set forth more definitely. For instance, it is not easy to determine just what is meant by "undilated cervix." Is it undilated because of some failure in the mechanism of labor, or does it mean that it was deemed inadvisable to delay the emptying of the uterus while the cervix slowly dilated? This reason for the performance of the operation was given in 111 instances. In 22 of the 111 cases other conditions besides the undilated cervix, such as narrow vagina, obesity, edema of the soft parts, etc., were given as indications for the operations.

Eclampsia alone was given as the indication in 116 cases or over a fifth of the series. Whether or not this be good practice, it is significant as showing the increased frequency with which abdominal Cesarean section is being performed for this condition, since 85 of the operations were performed from 1908 to 1913.

Contracted pelvis was given as a reason for the emptying of the uterus by the suprapubic route in 87 cases. In 9 of these cases narrow soft parts, prolapsed cord, etc., were stated as indications in

TABLE XI.
INDICATIONS FOR ABDOMINAL CESAREAN SECTION IN 500 CASES
OF ECLAMPSIA

Indications		Number of cases
Eclampsia		116
Undilated cervix.....	89	
+ narrow vagina.....	9	
+ obesity.....	6	
+ edema of soft parts.....	3	
+ weak heart.....	2	
+ previous ventrofixation.....	1	
+ obesity and edema of vulva.....	1	
	III	III
Contracted pelvis.....	78	
+ narrow soft parts.....	3	
+ large child.....	3	
+ prolapsed cord.....	1	
+ tetanus uteri.....	1	
+ tumor.....	1	
	87	87
Rigid cervix.....	72	
+ nonengagement of head.....	3	
+ tumor.....	1	
+ pelvic adhesions.....	1	
+ persistent nausea and vomiting....	1	
	78	78
Rigid soft parts other than cervix.....	10	
+ ulcers of vagina and vulva.....	1	
+ stricture due to scar tissue.....	1	
+ atresia vagina.....	1	
	13	13
Edema of soft parts.....	5	
Nonengagement of head.....	5	
Pelvic tumors.....	5	
Large child.....	3	
Impending death.....	2	
Viability of child.....	2	
Tetanus uteri.....	1	
Previous vaginofixation.....	1	
Uterine inertia.....	1	
Shoulder presentation.....	1	
Placental hemorrhage.....	1	
No statement regarding indication.....	68	
		500

addition to the contracted pelvis. It is rather surprising that there was not a larger proportion of contracted pelvises, since until recently this obstetric complication has been thought the only justifiable indication for abdominal Cesarean section in eclampsia.

In 78 cases the operations were performed for rigid cervix with additional indications in six of the cases. In all probability this does not tell the whole story for many of the 89 cases where the cervix was described as undilated were probably rigid in the sense that they were not readily dilatable, else the uterus would preferably have been emptied from below.

Rigid soft parts were given as indications in 13 of the cases while in 27 cases miscellaneous indications such as edema of the soft parts, nonengagement of the head, pelvic tumors, etc., led to the operations.

Every obstetric indication in the above list may under certain circumstances call for abdominal Cesarean section. On the other hand, certain other factors in connection with the case may absolutely contraindicate the suprapubic operation. For example, under the indication of undilated cervix there were nine cases where narrow vagina in addition to the cervical condition was given as an indication. It is perfectly justifiable and even imperative in certain cases where the vagina is of the infantile type and prompt emptying of the uterus is indicated, to terminate the pregnancy by abdominal Cesarean section. This would save the eclamptic from the trauma and shock of a mutilating operation which would have to be done were the vagina forcibly dilated preparatory to dilating the cervix. Now one of the first principles of the treatment of eclampsia is the avoidance of shock and trauma. Upon this those who believe in the medicinal treatment of antepartum eclampsia have based their argument of nonoperative interference. However, the abdominal Cesarean section would be performed for just this purpose. Quickly performed with no or with very little general anesthetic there would be less shock, far less from the abdominal operation than from prolonged attempts at delivery from below. With the elaboration of the eclamptic toxins put a stop to by the removal of the fetus and placenta, and vigorous postpartum eliminative treatment instituted, the patient will live or die dependent upon how much damage has been done by the eclamptic poison before its manufacture was put an end to by emptying the uterus.

Thus, rigid or undilated cervix plus a narrow vagina are perfectly valid indications for the performance of abdominal Cesarean section for eclampsia. However, if the patient with these obstetric com-

plications has been repeatedly examined or if attempts have been made unsuccessfully to dilate the vagina or cervix abdominal Cesarean section may, on account of the resulting sepsis, be absolutely contraindicated. Under such conditions it would be far better to inflict trauma from below and deliver the woman by craniotomy.

It still remains to be seen whether eclampsia itself without additional indications such as obstructions in the bony pelvis or the soft parts, is an indication for the emptying of the uterus by the abdominal route. Without discussing the general question of whether most is to be gained from the operative treatment of eclampsia or by treating the patient medicinally and allowing the pregnancy to take care of itself, certainly in the present state of our knowledge there are more successful methods of treating eclampsia than by abdominal Cesarean section. Yet the figures already quoted in this paper tend to show that the time may not be far distant when the abdominal operation may show results equal to if not better than any method of treatment. For it cannot be denied that a maternal mortality of 18.68 per cent. in 91 cases of antepartum eclampsia is a remarkably good showing. So is a 15 per cent. mortality in 60 cases where the operations were performed after not more than 5 convulsions and the patients were not infected prior to the abdominal operations by examinations or attempts at delivery from below.

Nature of the Operation and Maternal Mortality.—The variety of abdominal Cesarean section performed from 1908–1913 was recorded in 279 cases. In 269 of these cases the uterus was incised without removal while hysterectomy was performed in 10 cases after the removal of the child. In 6 of the 269 cases extraperitoneal Cesarean section was performed with 3 deaths while there were 263 classical Cesarean sections with 69 deaths. Combining these there were 269 of the conservative operation with seventy-one deaths or a maternal mortality of 26.39 per cent. while there was no mortality from the Porro operations. At first glance this would seem overwhelmingly in favor of hysterectomy following the sections but again it must be pointed out that statistics with a small number of cases have only a relative value. More Porro operations in eclampsia would undoubtedly change the result, to what extent it is difficult to say. It would seem as if the indication for the Porro operation, the presence or possibility of sepsis would not often be present in the class of cases under consideration. Under such conditions far more would be gained by vaginal Cesarean section or forcible dilatation and delivery from below, craniotomy being performed if necessary.

An endeavor was made in the questionnaire to secure information on various other matters of interest in the study of abdominal Cesarean section but the answers were so unsatisfactory and the data collected so incomplete that it has been thought best to give up the attempt to compile any accurate statistics from them. However, general impressions formed from the replies may be of some value.

Hemorrhage.—As far as could be ascertained and in fact as would be expected, there was very little hemorrhage either during or following the operation. As far as could be learned no patient died from this complication. Although it was extremely difficult to estimate the amount of blood lost by the comparatively few patients where the hemorrhage was spoken of as profuse, as far as could be judged loss of blood did not effect the maternal mortality favorably or otherwise. I merely mention this since Lichtenstein has arrived at the opposite conclusion from a study of his rather small number of cases and thinks the benefit of the operative treatment comes, not from emptying the uterus, but from the blood lost during the process.

Suture Material.—Catgut was the favorite suture material, since it was employed in 340 cases out of the 405 cases where statements were made regarding suture material. In half of the cases, 215, it was the only material employed while in 125 cases it was used in combination with such sutures as silk or linen. Silk was used alone in 48 cases and eight times in connection with other material.

Causes of Death.—A large proportion of the 73 deaths in the series of patients operated upon from 1908 to 1913 died from eclampsia or its sequelæ. Three patients died of shock, and one each of obstruction of the bowels and acute dilatation of the stomach. Phthisis was given as the cause of death in one case. During the same period 8 patients died from sepsis and in 7 instances the operations were performed upon patients who were moribund. While perhaps little good can come from such exclusions it is interesting to note that the total mortality, if we eliminate these last 15 patients would be reduced from 25.79 to 20.49 per cent., and there is reason for making such eliminations since such deaths are in no way the fault of the operation selected. In spite of assertions to the contrary the eclamptic woman will not die from sepsis unless she be infected before or at the operation. Lowered resistance she may have, as have also many women who must be subjected to abdominal Cesarean section. But that we should look to her general condition for an explanation of her death from septic infection is a mistake. And surely while the operation may be called for in the interest of the child or as a forlorn hope, fatalities resulting from

operating upon dying women should not be counted against any operation performed for any purpose.

Summary and Conclusions.—1. Since the 500 cases of abdominal Cesarean section represent the work of 259 operators they are a very fair index of the present status of the operation as a method of treating antepartum eclampsia.

2. Since the results of operative obstetrics, especially abdominal Cesarean section, are far better at the present time than formerly, the value of the operation as a method of treatment of eclampsia can only be judged by grouping the cases chronologically.

3. Between 1908 and 1913 there were 283 cases of eclampsia treated by abdominal Cesarean section with 73 deaths or a maternal mortality of 25.79 per cent. Up to 1908 there were 198 cases with 95 deaths or a mortality of 47.97 per cent. Hence the maternal mortality in the five-year period has been reduced nearly one-half.

4. Hence the old figures of a 40 or 50 per cent. maternal mortality from abdominal Cesarean section for eclampsia are incorrect and should no longer be quoted.

5. The mortality percentage quoted above (25.79) can be considerably lowered by care in technic and by not making use of the suprapubic route when there is great probability that the woman has been infected from below.

6. Nearly one-fifth of the entire series, 91 operations, were performed by thirteen men having five or more cases to their credit, with 17 deaths or a maternal mortality of 18.68 per cent.

7. Deducting 15 cases where the proportion of moribund and septic patients was very high, the remaining 76 cases with 10 deaths give a maternal mortality of 13.15 per cent.

8. Although an eclamptic may die after a single or survive after many convulsions, the latter must be utilized as an indication of the degree of eclamptic poisoning until we have a better method of estimating the patient's condition.

9. Emptying of the uterus either spontaneously or by artificial means, while it puts a stop to the further elaboration of toxins from the fetus, the placenta or both may not be sufficient to prevent further convulsions or in certain cases death of the mother from intoxication. In other words, so great has been the effect of the poison that convulsions continue after delivery or death ensues in spite of the relief afforded by emptying the uterus.

10. In the present series, convulsions ceased after abdominal Cesarean section in 251 out of 457 cases or in 54.92 per cent. These statistics agree with those made up from those obtained from thou-

sands of cases of eclampsia showing that convulsions cease after the emptying of the uterus either spontaneously or artificially in from 52 to 62 per cent. of the cases.

11. Even when the convulsions cease after delivery a certain proportion of the patients die. In 146 cases where the convulsions ceased after abdominal Cesarean section during the five-year period (1908-1913) there were 41 deaths or a maternal mortality of 19.8 per cent.

12. While the above percentage of patients died after emptying the uterus by abdominal Cesarean section after cessation of the convulsions the mortality is much less than where the convulsions continue, since in 130 of such cases there were 41 deaths or a maternal mortality of 31.53 per cent.

13. The operative treatment of eclampsia has never been given a fair trial. To do this the uterus should be emptied quickly, as soon as possible after the onset of the first convulsion, not emptied after all kinds of medicinal treatment have been tried and failed.

14. In the present series there were 25 deaths after 124 operations performed after one to five convulsions or a maternal mortality of 20.32 per cent.

15. The best results in the operative treatment of eclampsia are bound to follow immediate emptying of the uterus in cases where the woman has not been infected by frequent vaginal examinations or attempts at delivery from below. This is shown by the following:

16. In 60 of the 124 cases where the operations were performed after from one to five convulsions, where no or only one or two vaginal examinations had been made and where no attempts were made to deliver from below there were only 9 deaths or a maternal mortality of 15 per cent.

17. The increase in mortality due to delay is shown by a mortality of 30.33 per cent. where the operations were performed after the sixth convulsion. This is 10 per cent. higher than after quick delivery and 5 per cent. higher than the total mortality resulting during this same period (1908-1913).

18. In 60 cases where the convulsions ceased after operations performed after from one to five convulsions there were 8 deaths or a maternal mortality of 13.33 per cent. The mortality is twice as high (26.92 per cent) after operations performed under the same conditions except that the convulsions continued.

19. When the abdominal Cesarean sections were performed after more than five convulsions there was a resulting mortality of 26.31

per cent. where there was cessation of the convulsions and 36.36 per cent. where they continued.

20. The average number of convulsions in 386 cases of eclampsia in the abdominal Cesarean series was 9 where the cases were not grouped. The average was 10 up to 1908 and 8 from 1908 to 1913.

21. Twins occurred 21 times in 500 cases of abdominal Cesarean section for eclampsia or in 4.02 per cent. of the cases. This is over three times as frequent as are twins in normal cases.

22. Excluding premature children and counting all children as living who survived one hour after delivery there were 9 deaths from 1908 to 1913 where 248 children were delivered by abdominal Cesarean section or a fetal mortality of 3.62 per cent. Under the same conditions the fetal mortality was 10.69 per cent. if children dying the first three days after delivery be counted among the deaths. Even estimating the fetal mortality by this method it is much better than by any other method of treating eclampsia.

23. The fetus as well as the mother is affected by the eclamptic poison. The greater the number of the eclamptic convulsions before the delivery the greater the fetal mortality. Hence for the sake of the fetus the uterus should be emptied as soon as possible after the first convulsion. If other factors in the case call for abdominal Cesarean section the chances of the fetus will be much better than if another method of delivery be employed.

24. In 474 patients with eclampsia in the present series, 83.75 per cent. were primiparæ and 16.17 per cent. multiparæ. The relatively larger proportion of primiparæ was due to the fact that primiparous conditions, such as undilated and rigid cervix and rigidity of the soft parts, more often called for the abdominal operation than for other methods of delivery.

25. The maternal mortality is higher after abdominal Cesarean section in multiparous women than is the case with primiparous eclamptics. In the present series in 225 primiparæ the maternal mortality was 24.44 per cent. while in forty-eight multiparæ the mortality was 27.08 per cent.

26. The fetal as well as the maternal mortality is higher in multiparæ after abdominal Cesarean section. This is probably due to the greater degree of intoxication among the multiparæ since in both primiparæ and multiparæ the children, because of the nature of the operation employed, escape the traumatism of labor. The greater intoxication among the multiparæ is probably due to their being on the average older than the primiparæ, the average age of the former

in seventy-seven cases being 32.6 years while the average age of the latter in 397 cases was 24.6 years.

27. The maternal mortality in eclampsia after abdominal Cesarean section steadily increases with the age of the patients, it being 23.63 per cent. between the ages of sixteen and twenty and 31.11 per cent. between the ages of thirty-one and thirty-five.

28. The number of eclamptic cases in the present series steadily increased from the fifth month of gestation up to full term, also the farther advanced the pregnancy, the lower the maternal mortality.

29. Unless the aseptic technic employed in attempts to deliver from below be known, abdominal Cesarean section is contraindicated, so great are the dangers of fatal peritonitis when the patient is infected.

30. The high death rate of abdominal Cesarean section after operative procedures is shown by the fact that there were ten deaths in twenty-nine such cases, or a maternal mortality of 34.48 per cent. This 9 per cent. increase in mortality over the total mortality (25.79 per cent.) during the same period was undoubtedly due to sepsis, shock and delay in emptying the uterus.

31. The mortality is distinctly higher after abdominal Cesarean section in eclampsia if vaginal examinations have been made prior to the operations. The danger increases directly with the number of examinations made and the lack of asepsis employed.

32. Any obstetric condition which makes delivery by the natural passages prolonged and difficult may be an indication for abdominal Cesarean section in eclampsia. If delivery be decided upon the uterus should be emptied by the method which will perform the work the quickest and with the least trauma and shock to mother and child. However, it must be borne in mind that there is more danger of sepsis when the peritoneal cavity is opened.

33. With the present state of our knowledge of the results of abdominal Cesarean section for eclampsia it cannot be denied that older and more tried methods of emptying the uterus in eclampsia give better results in eclamptics with normal pelvis and soft parts, hence should not be lightly discarded in favor of the more brilliant and more easily performed abdominal operation.

34. But with a maternal mortality after abdominal Cesarean section of 18.68 per cent. in 191 cases of eclampsia in one series, 13.13 per cent. in seventy-six cases in another and 15 per cent. in sixty cases where the uterus was emptied after a few convulsions, the operation under consideration has reached a stage where it can no longer be disregarded by obstetricians who have based their opposi-

tion to the procedure upon statistics which were altogether too high.

BIBLIOGRAPHY

van den Akker. Quoted by Pollak: *Monatschr. f. Geburtsh. u. Gynäk.*, Berlin, 1904, XX, 344. Also quoted by Döderlein: *München. med. Wchnschr.*, 1894, xli, 510.

Alsberg (P.). Zur Nierendekapsulation bei Eklampsie. *Centralbl. f. Gynäk.*, Leipzig, 1909, xxxiii, 934-937.

Alsberg (P.). Zwei Mitteilungen zum EklampsietHEMA. *Centralbl. f. Gynäk.*, Leipzig, 1910, xxxiv, 6-9.

Baker. Kaiserschnitt bei Eklampsie. *Centralbl. f. Gynäk.*, Leipzig, 1897, xxi, 408.

Balattresi (U.). Storia di un' operazione cesarea per eclampsia. *Indipente*, Torino, 1881, xxxii, 625-631.

Batchelor (F. C.). Successful Cesarean section in a case of generally contracted and flattened pelvis with eclampsia. *Australas. M. Gaz.*, Sydney, 1898, xvii, 341-344.

Bidone (E.). Eclampsia puerperale con arresto completo del respiro naturale cinque ore e mezza prima della circolazione. *Ann. di ostet.*, Milano, 1901, xxiii, 146-168. Also, (Abstr.): *Centralbl. f. Gynäk.*, Leipzig, 1902, xxvi, 456.

Biermer (R.). Sectio caesarea, ausgeführt mit querem Fundalschnitt nach Fritsch, wegen schwerer Eklampsie am Ende der Schwangerschaft. *München. med. Wchnschr.*, 1899, xlvii, pt. 2, 1565.

Boldt (H. J.). Cesarean section for severe puerperal eclampsia on a child twelve years and eight months old with contracted pelvis. *Postgraduate*, N. Y., 1905, xx, 1251-1267. Also, (Trans.): *Monatschr. f. Geburtsh. u. Gynäk.*, Berlin, 1906, xxiii, 612-616.

Bonnaire (E.). Vingt opérations césarienne. *Presse méd.*, Paris, 1907, xv, 633-640.

Boyd (G. M.). A review of fourteen Cesarean sections successfully performed. *AMER. JOUR. OBST.*, N. Y., 1906, liv, 214-223.

Braun (G.). Lendenwirbelbogeneinschaltung. *Wien. med. Wchnschr.*, 1857, 24-26. Also (Abstr.): *Schmidt's Jahrb. d. gesamt. Med.*, 1857, xcvi, 328-330.

v. Braun-Fernwald (R.). Ueber die in den letzten zehn Jahren ausgeführten Sectiones caesareae. *Arch. f. Gynäk.*, Berlin, 1899, lix, 320-403.

Brothers (A.). Cesarean section for eclampsia in a moribund woman, with fatal results. *AMER. JOUR. OBST.*, N. Y., 1896, xxxiv, 539-532.

Brunner (C.). Quoted by Streckeisen: *Aach. f. Gynäk.*, Berlin, 1903, lxviii, 685-701.

Burmeister. *Centralbl. f. Gynäk.*, Leipzig, 1898, xxii, 315.

Burns (T. M.). A case illustrating the value of Cesarean section in eclampsia. *Colorado, Med.*, Denver, 1911, 183.

Burns (T. M.). Cesarean section: indications and technic: report of twenty-nine cases. *J. Am. M. Ass.*, Chicago, 1912, lviii, 80-86.

Caruso (F.). Die neuesten Ergebnisse des konservativen Kaiserschnittes mit Uterusnaht (nach Säger's Methode und anderen Nahtverfahren). *Arch. f. Gynäk.*, Berlin, 1888, xxxiii, 211-269.

Coen. Un caso di gravidanza nella metà sinistra di una utero didelfo, eclampsia, taglio cesareo. *Boll. d. Soc. Tosc. di ostet. e ginec.*, Firenze, 1902, i, 85-93.

Croom (Sir H.). Cesarean section in eclampsia. *Tr. Edinb. Obst. Soc.*, 1903-04, xxiv, 194-209.

Croom (J. H.). Notes on a case of puerperal eclampsia with hypertrophic and undilatable cervix; Cesarean section (Porro). *Med. Press and Circ.*, Lond., 1893, n.s., lv, 323.

Czempin. *Centralbl. f. Gynäk.*, Leipzig, 1892, xvi, 129.

Dauber (H.). Ueber Indikation und Ausführung des Kaiserschnitts. *Ztschr. f. Geburtsh. u. Gynäk.*, Stuttgart, 1905, liv, 282-293.

Davis (E. P.). Forty-eight cases of delivery by abdominal section. *Surg., Gynec. & Obst.*, Chicago, 1906, iii, 593-605.

Davis (E. P.). Six Cesarean sections. *AMER. JOUR. OBST.*, N. Y., 1902, xlv, 169-179.

Decio (C.). Di un taglio cesareo conservatore per eclampsia. *Ann di ostet. e ginec.*, 1896, xvii, 53-60. Also quoted by Pollak: *Monatschr. f. Geburtsh. u. Gynäk.*, Berlin, 1904, xx, 345.

Denny (D. W. C.). Cesarean section. *Indiana J. Med.*, 1870-72, ii, 310-313.

Dienst. Kritische Studien über die Pathogenese der Eklampsie auf Grund pathologisch-anatomischer Befunde, Blut- und Harnuntersuchungen eklamptischer Mütter und deren Früchte. *Arch. f. Gynäk.*, Berlin, 1902, lxxv, 369-464.

Döderlein. Die Therapie der Eklampsie. *München. med. Wchnschr.*, 1894, xli, 509-512.

Dorff. Zur Kasuistik des Kaiserschnittes nach der Methode von Porro. *Centralbl. f. Gynäk.*, Leipzig, 1879, iii, 266-268.

Engelmann (F.). Ueber die Behandlung der Eklampsie mittelst intravenöser Hirudininjektionen auf Grund von 14 Fällen. *Ztschr. f. Geburtsh. u. Gynäk.*, Stuttgart, 1911, lxxviii, 640-664.

Esch (P.). Ueber Eklampsie. *Ztschr. f. Geburtsh. u. Gynäk.*, Stuttgart, 1906, lviii, 11-62.

Esch (P.). Ueber Eklampsie neonatorum. *Ztschr. f. Geburtsh. u. Gynäk.*, Stuttgart, 1909, lxxv, 52-59.

Essen-Möller (E.). Eklampsi (konvulsioner) under hafvandeskapet; kejsarsnitt; död. (Eclampsia during pregnancy; Cesarean section; death.) *Jordemodern*, Stockholm, 1904, xvii, 146. Also: *Hygiea*, ii, 705-708.

Everke (C.). *Jahresber. f. Geburtsh. u. Gynäk.*, 1895, ix, case 9, p. 753.

Everke (C.). *Jahresber. f. Geburtsh. u. Gynäk.*, 1896, x, case 50, p. 825.

Everke (C.). Ueber die Anlegung des Uterusschnittes bei Sectio caesarea. *Monatschr. f. Geburtsh. u. Gynäk.*, Berlin, 1897, vi, 45-49.

Everke (C.). Ueber die Behandlung der Eklampsie. *München. med. Wchnschr.*, 1899, xlvi, pt. 2, 1562-1565.

Everke (C.). Ueber Kaiserschnitt. *Monatschr. f. Geburtsh. u. Gynäk.*, Berlin, 1901, xiv, 637-645.

Favell (R.). *Jessop Hosp. Rep.*, 1909, p. 19. Also quoted by Routh: *J. Obst. & Gynec. Brit. Emp.*, London, 1911, xix, 196.

Fehling (H.). Quoted by Pollak: *Monatschr. f. Geburtsh. u. Gynäk.*, Berlin, 1904, xx, 346.

Foster (T. A.). *Tr. Maine Med. Ass.*, 1868-69, 273-279.

Frank (F.). Die suprasymphysäre Entbindung und ihr Verhältniss zu den anderen Operationen bei engem Becken. *Arch. f. Gynäk.*, Berlin, 1907, lxxxi, 46-95. Also: *Samml. klin. Vortr.*, 1909, n. F., No. 534-535 (*Gynäk. Nr.* 196-197).

Frederick (C. G.). Present status of Cesarean section with areport of five cases. *AMER. JOUR. OBST.*, N. Y., 1908, lviii, 847-851.

Freund (H.). Ueber Kaiserschnitt aus gehäufte Indikationen. *Berlin. Klin. Wchnschr.*, 1900, xxxvii, 158-162.

Friedemann (B.). Ueber die Behandlung der Eklampsie ante partum. *Inaug. Dissert.*, Königsberg, 1897. Also, (Abstr.): *Berlin. klin. Wchnschr.*, 1903, xl, 835.

Friedemann (G.). Ueber die chirurgische Behandlung der Eklampsie. *Berlin. klin. Wchnschr.*, 1903, xl, 835.

Fromme (F.). Ueber extraperitonealen Kaiserschnitt. *Berlin. klin. Wchnschr.*, 1908, xlv, 147-149.

Gamble (H. F.). Report of a case of puerperal eclampsia; placenta previa, Cesarean section. *Yale M. J.*, N. Haven, 1908-1909, xv, 357-359.

Götze (A.). Sectio caesarea bei Eklampsie. Eine Statistik. *Inaug.-Dissert.*, Rostock, 1902. Also quoted by Büttner: *Arch. f. Gynäk.*, Berlin, 1903, lxx, 385.

Goldberg (O.). Beitrag zur Eklampsie auf Grund von 81 Fällen. *Arch. f. Gynäk.*, Berlin, 1891, xli, 295-327.

Gottschalk (S.). Beitrag zur Lehre von der Eklampsie (mit Demonstrationen von Präparaten). *Verhandl. d. deutsch. Gesellsch. f. Gynäk.*, 1895, vi, 600-620.

Graefe (M.). Ueber schwere Geburtsstörungen infolge von Vagino-fixatio uteri. *Monatschr. f. Geburtsh. u. Gynäk.*, 1895, ii, 473.

Griesel (E.). Ueber die in den letzten zehn Jahren aus der Jenerser geburtshilflichen Klinik ausgeführten sectiones caesareae abdominalis. *Inaug.-Dissert.*, Jena, 1906. Also (Abstr.): *Centralbl. f. Gynäk.*, Leipzig, 1907, xxxi, 547.

von Guérard (H. A.). Sectio caesarea bei Eklampsie. *Centralbl. f. Gynäk.*, Leipzig, 1902, xxvi, 1326-1329.

Gusserow. Quoted by Pollak: *Monatschr. f. Geburtsh. u. Gynäk.*, Leipzig, 1904, xx, 345.

Heggard (W. D.). Cesarean section for puerperal eclampsia; report of three successful cases with three living children. *J. Tennessee State M. Ass.*, 1912, iv, 391.

Haindl (G.). Ueber die Indikationsstellung zum klassischen und vaginalen Kaiserschnitt bei Eklampsie. *Erlangen*, 1906, 8°. Also (Abstr.) *Centralbl. f. Gynäk.*, Leipzig, 1907, xxxi, 372.

Halbertsma (T.). Eclampsia gravidarum; eene nieuwe indicatie

voor sectio caesarea. *Nederl. Tijdschr. v. Geneesk., Amst.*, 1889, 2. R., xxv, 2. d., 485-491.

Halbertsma (T.). Ueber Kaiserschnitt bei Eklampsie. *Internat. Congr. Berlin*, 1890.

Hammerschlag (S.). Zur Indikation und Technik des suprasymphyären Kaiserschnittes. *Centralbl. f. Gynäk.*, Leipzig, 1908, xxxii, 1600-1604.

Harrison (T. L.). Cesarean section under difficulties. *J. Am. M. Ass.*, Chicago, 1912, lix, 37.

Hartwig. Quoted by Pollak: *Monatschr. f. Geburtsh. u. Gynäk.*, Berlin, 1904, xx, 346.

Hefting (J. D.). Nog eens sectio caesarea bij eclampsia gravidarum. *Med. Weekbl.*, Amst., 1897-1898, iv, 449. Also quoted by Pollak: *Monatschr. f. Geburtsh. u. Gynäk.*, Berlin, 1904, xx, 346.

Heinze (H.). Ein Beitrag zur Therapie der Eklampsie. *Arch. f. Gynäk.*, Berlin, 1911, xciii, 151-187.

von Herff (O.). Operative Behandlung bei Eclampsia gravidarum. *Berlin. Klinik*, 1891, Hft. 32. Also (Abstr.) *Jahresber. f. Geburtsh. u. Gynäk.*, 1891, ccxxi, 45.

Herrenschneider. Die Behandlung der Eklampsie durch die Entfernung der Brüste. *Centralbl. f. Gynäk.*, Leipzig, 1911, xxxv, 673-677.

Hildebrandt. Zur Kaiserschnittsfrage. *Centralbl. f. Gynäk.*, Leipzig, 1910, xxxiv, 100.

Hillmanm (H.). Ein Fall von Sectio caesarea ausgeführt wegen Eklampsie. *Monatschr. f. Geburtsh. u. Gynäk.*, Berlin, 1899, x, 193-207.

van der Hoeven (L.). Tve gevallen van sectio caesarea. *Geneesk. Courant.*, Tiel, 1890, xlv, No. 23. Also quoted by Pollak: *Monatschr. f. Geburtsh. u. Gynäk.*, Berlin, 1904, xx, 344.

Holzapfel (K.). Rückblick und Betrachtungen über die Sectio caesarea abdominalis inferior. *Samml. Klin. Vortr.*, 1909, n. F., No. 534-535 (Gynäk. Nr. 196-197), pp. 37-95.

Hotaling (A. S.). Urinary analysis as a diagnostic aid in the toxemias of pregnancy. *AMER. JOUR. OBST.*, N. Y., 1911, lxiv, 952-959.

Ill (C. L.). A report of ten cases of Cesarean section performed at St. Michael's and St. Barnabas' Hospitals of Newark, New Jersey. *AMER. JOUR. OBST.*, N. Y., 1901, xlv, 648-657.

Jackson (F. H.). Preganacy complicated by eclampsia and fibroid of the uterus. *J. Maine M. Ass.*, 1911, ii, 362-364.

Johnson (S. H.). Case report of Cesarean section for eclampsia. *Northwest. Med.*, Seattle, 1908, vi, 149-151.

Johnston (G. B.). The present status of abdominal Cesarean section. *Old Dominion J. M. & S.*, 1910, xi, 249-255.

van der Kaay (G. J.). Eine neue Indikation zur Anwendung des Kaiserschnittes. *Inaug.-Dissert.*, Freiburg, i/B, 1891.

Kalisch. *Medic.-gerichtl. Gutachten*. Leipzig, 1859, 333. Also quoted by Runge: *Ztschr. f. Geburtsh. u. Gynäk.*, Stuttgart. 1883, ix, 251.

Kaltenbach. Quoted by Pollak: *Monatschr. f. Geburtsh. u. Gynäk.*, Berlin, 1904, xx, 345.

Kefting. (Sectio caesarea bei Eclampsie gravidarum). *Med. Weekbl. v. Noord-en Zuid-Nederland*, iv, No. 29. Also quoted by Pollak: *Monatschr. f. Geburtsh. u. Gynäk.*, Berlin, 1904, xx, 349.

Kemper (G. W. H.). A plea for Cesarean operation, based on a report of fifty-three cases performed in Indiana. *J. Indiana M. Ass.*, Fort Wayne, 1911, iv, 162-171.

Keyserlingk (R. B.). Bossi-Dührssen.klassischer Kaiserschnitt. *Centralbl. f. Gynäk.*, Leipzig, 1907, xxxi, 711-717.

Klein (G.). Ein bisher nicht beschriebenes Phänom bei Eklampsie. *Monatschr. f. Geburtsh. u. Gynäk.*, Berlin, 1900, xi, 588.

Klots (P. S.). Eclampsia. (Cesarean section). *Transvaal M. J.*, Johannesburg, 1906-7, ii, 160-163.

Knüpffer (A.). Ueber puerperale Eklampsie. *St. Petersb. med. Wchnschr.*, 1911, xxxvi, 55-57.

Kramer (A. J. H.). Sectio caesarea bij eclampsie. *Nederl. Tijdschr. v. Geneesk.*, Amst., 1904, 2, r., xl, d. 2, 833-835. Also: *Tijdschr. v. prakt. verlosk.*, Haarlem, 1904-1905, viii, 217-219. Also, (Abstr.): *Centralbl. f. Gynäk.*, Leipzig, 1905, xxix, 932.

Kroemer. Zur Indikationsstellung des extraperitonealen Kaiserschnittes und der subkutanen Pubotomie. *Centralbl. f. Gynäk.*, Leipzig, 1908, xxxii, 1374.

Küstner (O.). Kaiserschnitt, Rückblicke und Ausblicke. *Ztschr. f. Geburtsh. u. Gynäk.*, Stuttgart, 1908, lxviii, 407-483.

Laubenburg (K. E.). Der Kaiserschnitt in der Praxis. *Deutsche med. Wchnschr.*, 1910, xxxvi, 313-316.

Lennander (K. G.). Tre kejsarsnitt dels vid eklampsie, dels in agone. *Uppsala Läk. Förhandl.*, 1899, iv, 317-325.

Leopold (G.). Quoted by Pollak: *Monatschr. f. Geburtsh. u. Gynäk.*, Berlin, 1904, xx, 346.

Loewenstein (H.). Drei Fälle von Kaiserschnitt bei Eklampsie. *Centralbl. f. Gynäk.*, Leipzig, 1902, xxvi, 117-120.

Lundblad (O.). Tre kejsarsnitt jämte nagra ord om eklampsiens behandling. *Hygiea*, Stockholm, 1907, 2. f., vii, 714-722. Also, (Abstr.): *Jahresber. f. Geburtsh. u. Gynäk.*, 1907, xxi, 754.

Maguire (K. M. N.). A case of Cesarean section for eclampsia. *Med. Press and Circ.*, London, 1911, n.s., xci, 140-142.

Marsh (J. P.). Cesarean section done under spinal anesthesia for eclampsia: report of three cases. *J. Am. M. Ass.*, Chicago, 1912, lix, 940.

Martin (A.). Kaiserschnitt bei Eklampsie. *München. med. Wchnschr.*, 1900, xivii, pt. 2, 947.

Martin (P. F.). Remarks on Cesarean section, with report of a case. *Med. Rec.*, N. Y., 1906, lxx, 653.

Maxwell (R. D.). Case of puerperal eclampsia treated by Cesarean section. *Proc. Roy. Soc. Med.*, Lond., 1912, vi, No. 2, *Obstet. & Gynec. Sect.*, pp. 43-47.

McCann (F. J.). Cesarean section in the treatment of eclampsia

gravidarum. *Med. Press & Circ.*, Lond., 1910, lxxxix, 594. Also: *Lancet*, Lond., 1910, ii, 789-792.

McPherson (R.). Indications for abdominal Cesarean section with the technic of the operation and analysis of 352 cases from the wards of the New York Lying-in Hospital. *AM. J. OBST.*, N. Y., 1912, lxvi, 33-44.

Meller (J.). Ein Fall von Eklampsie mit Indikation zum Kaiserschnitt. Würzburg, 1893. 8°.

Metzlar (C.). Sectio cesarea bij eclampsia puerperalis. *Med. Weekbl.*, Amst., 1910-11, xvii, 565.

van der Mey. *Centralbl. f. Gynäk.*, Berl., 1892, xvi, 128.

Montini (A.). Di un taglio cesareo conservatore per eclampsia gravidica. *Gazz. d. osp.*, Milano, 1910, xxi, 1353-1354.

Morison (A. E.). Notes on five cases of abdominal section for emergencies during pregnancy. *Tr. Edinb. Obst. Soc.*, 1902-3, xxviii, 148-170.

Müller (P.). Quoted by Pollak: *Monatschr. f. Geburtsh. u. Gynäk.*, Berl., 1904, xx, 350.

Mullally (L.). Abdominal Cesarean section for eclampsia. *South. Med. J.*, Nashville, 1910, iii, 66-69. Also: *Surg., Gynec. & Obst.*, Chicago, 1910, x, 211. Also: *AM. J. OBST.*, N. Y., 1910, lxi, 305-307.

Neumann (J.). Die Sectio caesarea an der Klinik Schauta. *Arch. f. Gynäk.*, Berl., 1906, lxxix, 1-157.

O. (R.) Enges Becken; Eklampsie; Kaiserschnitt. *Allg. deutsch. Hebam.-Ztg.*, Berl., 1906, xxxii, 420.

Olshausen (R.). Ueber Kaiserschnitt bei Eklampsie. *Centralbl. f. Gynäk.*, Leipzig, 1900, xxiv, pt. 1, 62. Also: *Ztschr. f. Geburtsh. u. Gynäk.*, Stuttgart, 1900, xlii, 348.

Opitz (E.). Uterus von einem Fall von Eklampsie. *Verhandl. d. deutschen Gesellsch. f. Gynäk.*, 1911, xiv, 568.

Ostroil (A.). Beitrag zur Therapie der Eklampsie. *Arch. f. Gynäk.*, Berlin, 1902, lxvii, 623-654.

Paucot et Leclercq. Eclampsie. Césarienne abdominale. Mort par pneumonie. Reins polykystiques. *Bull. Soc. d'obst. et de gynéc. de Paris*, 1912, i, 628-634.

Pobjedinski (N. J.). (Zur Lehre über die Entbindung bei Eklampsie.). *J. akush. i jensk. boliez.*, St. Petersburg, 1909, xxii. Also, (Abstr.): *Centralbl. f. Gynäk.*, Leipzig, 1910, xxxiv, 113.

van de Poll (C. N.). Sectio caesarea bij eclampsia gravidarum. *Nederl. Tijdschr. v. Verlosk. en. gynaec.*, Haarlem, 1891, iii, 266-270. Also, (Abstr.): *Centralbl. f. Gynäk.*, Leipzig, 1892, xvi, 129.

Pollak (E.). Weitere Beiträge zur Technik der mechanischen Dilatation mit spezieller Berücksichtigung ihrer Erfolge in der Eklampsiebehandlung. *Monatschr. f. Geburtsh. u. Gynäk.*, Berlin, 1904, xx, 335-358; 951-961.

Pomy (L.). Ueber vierzig Fälle von Eklampsie. *Inaug.-Dissert.*, Göttingen, 1907.

Poten (W.). Prov.-Hebammenlehranstalt. Hannover, 1896. Also quoted by Pollak: *Monatschr. f. Geburtsh. u. Gynäk.*, Berlin, 1904, xx, 346.

Poucher (J. W.). The Cesarean operation. *N. York State J. Med.*, 1912, xii, 70-73.

Prince (E. M.). Cesarean section. A discussion of the technic with report of eleven cases. *Surg., Gynec. & Obst.*, Chicago, 1912, xiv, 61-65.

Reddy (H. L.). Indications for Cesarean section other than pelvic deformities and tumors. *Brit. M. J.*, Lond., 1906, ii, 1200-1202.

Reid (W. B.). Cesarean section. Indications for operation; technic and results in five recent cases. *N. York State J. Med.*, N. Y., 1908, viii, 3-6.

Reijenga (J.). De sectio caesarea bij een geval van eklampsie de graviditeit. *Nederl. Tijdschr. v. Geneesk.*, Amst., 1891, 2. R., xxvii, pt. 2, 785-788. Also quoted by Pollak: *Monatschr. f. Geburtsh. u. Gynäk.*, Berlin, 1904, xx, 345.

Ribbius. *Centralbl. F. Gynäk.*, Leipzig, 1902, xxvi, 595.

Richmond (J. L.). *West. J. Med. & Phys. Sc.*, 1830, iii, 485. Also: *Indiana J. Med.*, 1872-3, iii, 129.

Risseeuw (A. J.). Over eklampsie bij zwangeren en abdominale kejsarsnede. *Nederl. Tijdschr. v. Geneesk.*, Amst., 1910, xlv, pt. 2, 1072-1077. Also: *Nederl. Weekbl.*, ii, 14.

Rossier. Eclampsie. *Rev. med. de la suisse Rom.*, 1911, xxxi, 404. von Rosthorn. Quoted by Pollak: *Monatschr. f. Geburtsh. u. Gynäk.*, Berlin, 1904, xx, 344.

Rotter (H.). Eklampsia miatt végzett abdominális császármetés. (Abdominal Cesarean section for eclampsia.) *Orvosi het.*, Budapest, 1907, xliii, 736.

Routh (A.). On Cesarean section in the United Kingdom. With tables of 1282 cases of Cesarean section by over 100 obstetricians and gynecologists of the United Kingdom, who were living on June 1, 1910. *J. Obst. & Gynec. Brit. Emp.*, Lond., 1911, xix, 1-233.

Runge (E.). Erfahrungen bei dem suprasymphysären Kaiserschnitt. *Arch. f. Gynäk.*, Berlin, 1909, lxxxix, 425-443.

Russell (A. W.). Quoted by Routh: *J. Obst. & Gynec. Brit. Emp.*, Lond., 1911, xix, 224.

Salin (M.). Ett fall af kejsarsnitt vid eklampsie. (A case of Cesarean section with eclampsia.) *Svens. läk.-sällsk. sammank.*, 1902, 115-120. Also: *Hygiea*, 1902, F. 11. Also, (Abstr.): *Centralbl. f. Gynäk.*, Leipzig, 1903, xxvii, 1511.

Schatz. Quoted by Pollak: *Monatschr. f. Geburtsh. u. Gynäk.*, Berlin, 1904, xx, 350.

Schauta (F.). Quoted by Wertheim: *Wein. klin. Wchnschr.*, 1892, V. 531-534.

Scheidler. Der Franksche Uterusschnitt. *Klin.-Dem.d. stadt. Krankenh. zu Dortmund*, October 13, 1908. *Med. Klinik*, 1909, No. 5.

Schell (J. T.). Some unusual indications for Cesarean operation. *Surg., Gynec. & Obst.*, Chicago, 1912, xv, 226-228.

Schell (W.). Cesarean section as a means of rapid delivery in eclampsia. *J. Indiana M. Ass.*, Fort Wayne, 1910, iii, 16-20.

- Schmidt. Quoted by Pollak: *Monatschr. f. Geburtsh. u. Gynäk.*, Berlin, 1904, xx, 349.
- Schreiber (G.). Ein Beitrag zur Statistik der Eklampsie. *Arch. f. Gynäk.*, Berlin, 1896, li, 335-357.
- Schütte. Ueber einen seltenen Fall von Ruptura uteri. *Monatschr. f. Geburtsh. u. Gynäk.*, Berlin, 1904, xx, 886-892.
- Seiffart. Drei Kaiserschnitte aus relativer Indikation. *Centralbl. f. Gynäk.*, Leipzig, 1907, xxxi, 956-958.
- Seitz (L.). Zur Klinik, Statistik und Therapie der Eklampsie. *Arch. f. Gynäk.*, Berlin, 1909, lxxxvii, 78-130.
- Sewijugo (N. S.). (Zwei Fälle von klassischem Kaiserschnitt bei Eklampsie). *J. akush i. jensk. boilez.*, St. Petersburg, 1909, xxiii, 1547.
- Simrock (E.). Die Schnellentbindung bei Eklampsie. *Inaug.-Dissert.*, Bonn, 1909.
- Sippel (A.). Kaiserschnitt wegen Eklampsie. *Monatschr. f. Geburtsh. u. Gynäk.*, Berlin, 1901, xiv, 280-287.
- Skeel (R. E.). Puerperal eclampsia; report of cases, one of which was treated by Cesarean section. *Am. Gynec.*, Balt., 1903, iii, 502-510.
- Smith (W.). A case of Cesarean section in eclampsia. *J. Am. M. Ass.*, Chicago, 1906, xlv, 1355.
- Smyly (Sir W.). Quoted by Routh: *J. Obst. and Gynec. Brit. Emp.*, Lond., 1911, xix, 226.
- Staude. Einige Bemerkungen zur Technik und Indikation des Kaiserschnittes. *Deutsche med. Wchnschr.*, 1891, xvii, 1149-1151.
- Steinbrecher (W.). Kaiserschnitt. *Inaug.-Dissert.*, Berlin, 1901.
- Stillwagen (C. A.). Cesarean section. *J. Am. M. Ass.*, Chicago, 1912, lix, 772-775.
- Strassmann (P.). Zur Kenntniss des Schwangerschafts- und Geburtsverlaufes bei antefixirtem Uterus. *Arch. f. Gynäk.*, Berlin, 1896, l, 473-510.
- Streckeisen (E.). Ueber zwei Fälle von Sectio caesarea wegen Eklampsie. *Inaug.-Dissert.*, Zürich, 1903. Also: *Arch. f. Gynäk.*, Berlin, 1903, lxxviii, 678-729.
- Stumpf. Ueber puerperale Eklampsie. *Centralbl. f. Gynäk.*, Leipzig, 1886, x, 459. Also: *Arch. f. Gynäk.*, Berlin, 1886, xxviii, 471. Also: *Verhandl. d. Deutsch. Gesellsch. f. Gynäk.*, 1886, i-iii, 161-172.
- von Swieicki (H.). Sectio caesarea wegen Eklampsie am Ende der Schwangerschaft. *Wien. med. Bl.*, 1891, xiv, 397.
- Tompkins (J. McCaw). Cesarean section in eclampsia, with recovery of mother and child. *Old Dominion J. M. and S.*, Richmond, 1908-1909, vii, 25-27.
- Trenité (Nolst). Eclampsia gravidarum naar aanleiding vaan een geval. *Med. Weekbl. v. Noord-e Zuid-Nederland*, 1896, No. 23. Also, (Abstr.): *Jahresber. f. Geburtsh. u. Gynäk.*, 1896, x, 703.
- Traub (H.). Sectio caesarea mit individueller Indikation. *Centralbl. f. Gynäk.*, Leipz., 1901, xxv, 141.
- Walcher (G.). Abspritzen des Kolostrums bei Eklampsie. *Centralbl. f. Gynäk.*, Leipzig, 1912, xxxvi, 1388-1391.

Walls (W. K.). Quoted by Routh: *J. Obst. and Gynec. Brit. Emp.*, Lond., 1911, xix, 72.

Wanner (R.). Zwei Kaiserschnitte bei Eklampsie. *Centralbl. f. Gynäk.*, Leipzig, 1904, xxviii, 1339-1341.

Weber (E.). Zehn Fälle von Sectio caesarea mit sagittalem Fundalschnitt. *Centralbl. f. Gynäk.*, Leipzig, 1899, xxiii, 1105-1109.

Wegelin (C.). Ueber Aneurysmata dissecantia bei puerperaler Eklampsie. *Berlin. klin. Wchnschr.*, 1909, xli, 2094-2096.

Wertheim (E.). Drei Fälle von Kaiserschnitt bei Eklampsie. *Wien. klin. Wchnschr.*, 1892, v, 531-534.

Williams (D. H.). A report of two cases of Cesarean section under positive indications, with terminations in recovery. *AM. J. OBST.*, N. Y., 1901, xlv, 315-322.

Woodbury (F. T.). Report of a case of puerperal convulsions for which Cesarean section was required. *N. York M. J.*, 1905, lxxxii, 999-1001.

Woodbury (F. T.). The Cesarean operation under difficulties. *N. York M. J.*, 1907, lxxxv, 838-840.

Wysor (J. C.) & Ayers (E. A.). Three unpublished Cesarean sections. *AM. J. OBST.*, N. Y., 1896, xxxiii, 549-553.

Zweifel (P.). Zur Behandlung der Eklampsie. Bericht über 129 hier beobachtete Fälle. *Centralbl. f. Gynäk.*, Leipzig, 1895, xix, 1201, 1238, 1265, 1342.

PATHOLOGY AND TREATMENT OF GONORRHEAL CERVICITIS AND ENDOMETRITIS.*

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A STRIKING phrase may so epitomize the clinical interpretation of a medical subject at some important era in its history as to assume the nature of an aphorism, and this may for some time dominate our views and blind us to obvious facts that, if followed logically, might lead to different conclusions. The classic experiment of Hunter, who inoculated his own person with pus that he presumed to be of gonorrheal origin, and so produced a chancre, fixed the identist theory of syphilis and gonorrhea so completely that for almost a century these diseases were considered identical; both were regarded as having a common origin, but displaying under varying conditions divergent manifestations. Although Ricord, a half century later, made a clear division, which was sustained by convincing clinical observations, nevertheless, the medical profession

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only gradually accepted the theory of the dual nature of these two diseases. In our present attitude concerning the incurability of gonorrhea of the endometrium we are dominated largely by the remarkable paper of Noeggerath, and in accepting the expressive dictum, "once infected, always infected," we may occasionally class as hopelessly diseased a patient who with skilfully applied local treatment might be cured in the earlier stage of a chronic gonorrheal cervicitis or even of an endometritis. There is ample time, as a rule, between the onset of a primary infection of the cervix or endometrium and the stage when it has extended to the Fallopian tubes, for remedial measures to be instituted that might be effective in eradicating the disease. Some of the reasons for instituting a more aggressive treatment of these cases may be based upon the following postulates:

1. Gonorrhea is a disease that even in its chronic stage may remain localized to the cervix or endometrium for months or years before it extends to and involves the tubes or the pelvic peritoneum.

2. Although it progresses slowly, if its advances are not permanently checked, it will usually sooner or later involve the tubes.

3. So long as the infection is confined to the cervix and endometrium, the disease is a superficial one, and it is not until late in its course that it tends to penetrate deeply into the submucosa.

4. The infection vacillates between acute exacerbations and more or less lengthy intervals of latency during which the infection shows no tendency to progress.

5. Gonorrhea even when confined to the endometrium may cause sterility, a condition that will almost certainly obtain when the infection has reached the tubes.

6. In the event of tubal involvement the aid of radical surgery must be invoked in order to eradicate the diseased tissues.

This is a general way epitomizes the course of chronic gonorrhea when it has reached the cervical endometrium. There is a strong probability that the disease will sooner or later reach the Fallopian tubes; in spite of this likelihood, as matters stand today so long as the pathologic process is confined to the endometrium, we observe the most extreme conservatism as regards the institution of active treatment lest by our activity we spread the disease to the tubes.

In the light of our present methods of examination and our means of treatment are we justified in permitting all cases to drift along, alternating their active exacerbations by their periods of latency, until finally they reach the surgeon's table, where, indeed, conserva-

tism occupies a small field and radical extirpation of the generative organs is the rule?

Of recent years the most pessimistic views as regards the curability of a cervical or fundal gonorrhea have generally been held, and the gynecologist has become a sort of therapeutic nihilist in his attitude toward this subject. Certainly in the great majority of cases the conclusion is well sustained, for the public or clandestine prostitute who is constantly being subjected to repeated infection cannot be permanently cured, nor can the woman who, although innocently infected, continues to cohabit with her husband, who is the subject of a chronic gleet, expect that a lasting cure can be effected. In such cases palliative measures to relieve or overcome acute symptoms alone are possible.

If we exclude this large class of individuals from those in whom a cure is possible, it becomes quite obvious that only in the isolated case may we hope to give permanent relief. Before instituting any form of treatment, therefore, the physician should ascertain whether a source of recurring infection exists.

The curable cases are those in which the infection may have been transmitted by a male subject in the final stage of curative treatment, and in the patient who has acquired the disease accidentally in unclean toilet rooms and the like. Although in the aggregate of infected women only a few may fall into this class, nevertheless in the course of our daily practice they are by no means infrequently encountered. It is the duty of the gynecologist to detect just such cases and to apply such vigorous measures as will permanently relieve the patients. Except for these restrictions, I am certain that a more active policy may be adopted in isolated instances than has hitherto been in vogue.

With our modern facilities for exposing the cervix and permitting direct inspection under artificial light, local applications may be made with a minimum amount of danger and with the probability of securing much greater therapeutic effect than was formerly possible. To revert to the crude methods of former years in the revival of this method of intrauterine treatment would certainly be followed by a repetition of the bad results that have cast such serious discredit upon all forms of local treatment.

No treatment should be attempted unless the cervix can be brought into view and efficiently cleansed under direct vision before the medicament is introduced; this is done by means of a Braun's syringe or by an intrauterine applicator. We are still loitering within the sinister shadow of these discredited older methods of intrauterine

application that were discarded during the earlier aseptic era. The disastrous consequences of careless methods prior to this time naturally instilled the greatest fear in the mind of the physician of introducing a more dangerous infection or causing the spread of the existing one.

With these well-attested hazards before us, it is with considerable hesitation that one offers any suggestion looking toward return to the discarded methods of former days. There is, however, a well-marked tendency to revert to the application of local treatment to the endometrium; this tendency is manifested in the recent literature on the subject, which emanates not from the pen of the mediocre, but from that of the most able clinicians. A departure of this nature, however, should be adopted with restriction, and only by those working along special lines, until it has been established upon a sound technical basis. The medical history of from twenty to forty years ago reveals only too tragically the dangers incident to the use of a sound or an applicator in unclean hands.

The obtrusive question in considering the treatment of an endometritis or even of a cervicitis is—"What constitutes a reliable sign or symptom of cervicitis or endometritis?" As to a chronic gonorrheal infection, the history is the factor of primary importance. Next in the order of importance are the ocular evidences as they are seen to exist at the external os uteri; the cover-glass examination; and finally, if, as is usual in the chronic stage, a curettage is performed, the microscopic study of the endometrium.

The epoch-making study of Hitchman and Adler in 1908 has so revolutionized our ideas concerning the cyclic change that takes place in the normal endometrium that upon this new basis the pathology has been recast. Prior to this time an almost endless variety of endometrial transformations were believed to exist, and these were classified under the all-embracing term "endometritis."

Many of these so-called pathologic changes are now known to be mere cyclic physiologic manifestations. The entire subject has, therefore, been greatly simplified and established on a scientific basis. In a recent paper, Hitchman and Adler take up the subject of endometritis, and render the situation, so far as symptomatology is concerned, quite clear. They reject variations in menstruation as a sign of endometritis, and restrict the symptomatology to the presence of a mucopurulent leukorrhea.

Inflammation of the endometrium does not, *per se*, in the presence of normal ovarian activity, give rise to any disturbance of the regular cycle, and, therefore, the regular periodicity of menstruation

remains unchanged. Nor does the presence of inflammation in the endometrium cause a proliferation of the glands, as has been assumed.

In making the microscopic diagnosis of *true endometritis* (*i.e.*, an actual *inflammation* of the uterine mucous membrane) no dependence can be placed on the condition of the blood-vessels and stroma, owing to the cyclic changes that are constantly occurring in these structures but the diagnosis will rest, rather, on the demonstration of an infiltration of round and plasma cells. The more recent the inflammatory process, the more pronounced is this infiltration of round-cells, and the less need is there for special staining; as the process grows older, however, and the infiltration becomes correspondingly more intense, the specific plasma-cell stains become of greater importance. The former dictum of these writers that "plasma cells are the absolute criterion of endometritis," must be modified somewhat, for although it is certainly true that the easiest way to diagnose endometritis microscopically is to demonstrate the presence of plasma cells, yet if round cells can be definitely recognized by the ordinary methods, there can be no objection to their use.

The classic triad of clinical symptoms commonly associated with endometritis—irregular bleeding, pain, and discharge—must be discarded; the only one of these manifestations that can be brought into a true causal relationship with the disease is the evidence of a *discharge*. Except in those cases in which purely mechanical causes exist, such as polypi, submucous tumors, carcinoma, etc., the author believes that no alteration in the endometrium *itself* is ever directly responsible for excessive or irregular hemorrhage. No matter what changes, inflammatory or otherwise, take place in the uterine mucosa, hemorrhage does not, in the opinion of the aforementioned authors, result unless the *ovaries* are diseased; in other words, the cause of the menorrhagia and metrorrhagia is never localized in the uterus unless it is due to one of the mechanical conditions previously mentioned. Hitchman and Adler would discard completely from our pathologic nomenclature the terms "hypertrophic" and "hyperplastic glandular endometritis"; the former term applies to a condition that is in no wise pathologic, but merely represents the normal premenstrual stage; the latter term covers, in addition to this, variations in glandular proliferation within normal limits, and in part applies also to conditions of genuine glandular hypertrophy of the uterine mucosa, which, however, have nothing to do with inflammation. These investigators do not believe that hyperplasia and glandular proliferation of the endometrium have any

etiologic connection with hemorrhage, nor do they believe that the character of such a mucosa is ever affected by curettage, since tissue regeneration occurs from portions of mucosa that have not been removed and hence it assumes the same characteristics it possessed before the operation. That this is indeed the case is shown by the comparatively few instances of uterine hemorrhage that are permanently cured as the result of curettage.

As regards pain, the authors mentioned have observed so many cases in which a true endometritis has existed for prolonged periods without giving rise to pain until other definite conditions, such as parametritis, perimetritis, or swelling of the adnexa developed, that the endometritis cannot directly be held as bearing any etiologic relation to this symptom.

There remains, then, as the sole symptom of an uncomplicated endometritis, merely the purulent discharge from the uterus, a phenomenon that corresponds to the existing anatomic condition, namely, an exudation of inflammatory cells throughout the endometrial tissue. This exudate must be clearly differentiated from the physiologic secretion of the glands, and also from the desquamative catarrh of the vagina, a distinction that readily can be made with the microscope.

The authors quoted believe that far too much clinical importance has been attached in the past to "endometritis"; not only has the mere existence of a discharge been credited with having an important influence on the general condition of the patient, but endometritis has been held responsible for every form of pathologic uterine condition.

From this study it becomes obvious, therefore, that mere glandular changes alone cannot be regarded as diagnostic, but that in addition, the presence of either plasma-cells or round-cell infiltration is essential. Our treatment following curettage, therefore, must be dependent to a considerable extent upon the pathologist. In the present stage of transition or revision of the pathology of the endometrium the pathologist, who is not fully abreast of the times, may lead us far astray; conversely, he may aid us greatly in pointing out the therapeutic way.

Treatment.—From the foregoing it is evident that the simple curettage which is so much in vogue at present is worse than useless when performed in the hope of curing gonorrheal endometritis. It is of value only for diagnostic purposes. In order to secure therapeutic effects some one of the bacterial remedies must be employed. For this purpose a 5 per cent. solution of iodine appears to be

effective. Formalin in very weak solution is of great value as an application, as will be pointed out further on in considering methods of treatment; it is an efficient germicide and coagulates albumin, thus causing necrosis and desquamation of the superficial or gonorrheal infected portion of the endometrium.

In treating leukorrhea it is the custom to prescribe an antiseptic douche. This measure is only of cleansing and cosmetic value at most but for therapeutic purposes possesses virtue.

Of the numerous treatments recommended for this condition those that have been well tested and have been found serviceable are the following:

Antifermentative Treatment.—Every mucopurulent discharge contains a large number of polymorphonuclear leukocytes the result of diapedesis from the increased blood stream produced by irritant effects upon the uterine mucosa. These cells contain a ferment that has a proteolytic action, causing extensive liquefaction of tissue and a consequent mucopurulent discharge. By using an antiferment locally the action of the pathologic ferment may be neutralized or destroyed, and the purulent process thus be arrested or cured. According to Stocker, who, since 1909, has used a preparation sold under the trade name of "Leukofermatin," this treatment in his hands has been followed by 68 per cent. of absolute cures—certainly strikingly good results compared with those obtained by the usual methods in vogue. The mode of treatment employed by Stocker is as follows: The cervix is exposed and cleansed, and a narrow strip of gauze saturated with leukofermatin is introduced into the cervix; this is replaced the next day by a similar strip, a decided improvement being noticed after two or three treatments. During this time no douche is given. If the fundal mucosa is involved, 1 or 2 c.c. of leukofermatin are injected, under very gentle pressure, by means of a Braun's syringe.

The Yeast Treatment.—A somewhat similar treatment, and one based upon the same line of reasoning, is the treatment of leukorrheal discharge by means of yeast. Abraham (*Monatschr. f. Geburtsh. und Gynäk.*, Band xxxi) found that when certain bacteria were brought into contact with yeast they were quickly destroyed. Thus the gonococcus disappeared in six hours, and other bacteria at longer intervals. This remedy is employed in the form of a yeast powder. The mode of application is as follows: A glass speculum is introduced into the vagina, and the cervix and vaginal walls are thoroughly cleansed with cotton. From 2 to 5 grams of the powder are then blown against the cervix and the vaginal walls by means of an in-

sufflator. In other cases 3 grams of the powder are inclosed in a soluble capsule, which is placed against the cervix and held there by means of a tampon. The latter method is the preferable one in the treatment of cervicitis. Abraham has used this treatment in over 200 cases, and has secured better results than were obtained by the active chemical applications.

Formalin Treatment.—Formalin applications have been very highly recommended by Menge in the treatment of endometritis. He discards the uterine syringe, and uses instead a long, slender wooden applicator, one end of which is closely wrapped with cotton and dipped in formalin solution of commercial strength. Three of these applications are made in quick succession to the interior of the uterus. As considerable pain may follow the treatment, the patient should remain in the office for at least one-half hour. These applications must be made not oftener than fourteen days apart. Menge, Döderlein, and Krönig have had excellent results with this treatment. In our experience, both in office and dispensary practice, we have found the application of formalin too painful, and although so far as ultimate results are concerned it acts very well, American women will not, as a rule, submit to a second treatment, because of the production of more or less severe uterine colic. For this reason we were compelled to abandon this form of treatment.

The method used by me during the last two years is as follows: The cervix is exposed with a trivalve speculum. I do not attempt to draw down the uterus with a tenaculum, for although the cervix is quite insensitive, even slight tugging upon a uterus that may be very sensitive may make the patient nervous and frustrate or render our efforts to carry out the treatment unsafe. As little manipulation of the parts as possible is done. To facilitate the best exposure one of the newer Nernst spot lamps, which cast a brilliant white light into the vagina and give the truest color values, is used. The cervix is cleaned with a 1 : 1000 bichlorid solution, or is painted with a 5 per cent. iodine solution. If the uterine cavity is quite sensitive, a fact that may be ascertained by passing a sound under direct vision, being careful never to permit it to come in contact with the speculum, 1 c.c. of a 5 per cent. solution of sterile novocain, prepared fresh for each sitting, and made by dissolving a tablet in sterile water, is injected with a Braun's syringe. The slender nozzle of the syringe is introduced very gently until the top of the fundus is reached, and then the solution is slowly expelled. Administered in this careful way, there will be no uterine spasm. In from three to five minutes 1 c.c. of a 5 per cent. solution is

injected in the same way. These treatments are given once weekly, for four or five weeks, and then a month is allowed to intervene without treatment in order to observe the result.

I am inclined, in the future, to supplement this treatment by the yeast method of Abraham or the leukofermatin application of Stocker. From my experience, which is sustained by recent reports of many excellent gynecologists, I am of the opinion that no harm can result from these treatments if all the precautions here laid down as regards the technic are observed. Certainly even a return to local applications by the great body of general practitioners could do no more harm—indeed, I believe much less—than the indiscriminate and illogical use of the curet, which has been practised so generally in the past two decades. Too often, alas! the tendency has been to put into practice the dictum—"When in doubt as to what to do, curete." Fortunately, among representative gynecologists this practice of indiscriminate cureting has long since been abandoned, but with the less experienced, it is still too often employed.

Finally, in the obstinate cases, especially in those in which the cervical glands are more or less distended and the seat of a persistent infection, the plan suggested by Hunner, of making spoke-like superficial incisions into the vaginal portion of the cervix with a galvanic cautery, has the greatest value. In some cases its effect is magical in clearing up a most intractable leukorrhea incident to a glandular cervicitis. The incisions must not impinge upon the cervical canal, nor must they be made too deep or too broad, for there is danger of cicatricial stenosis following, although in my experience I have never seen this occur as a sequel to incisional cauterization.

2017 WALNUT STREET.

THE THERAPEUTIC VALUE OF X-RAY AND THE RADIO-ACTIVE SUBSTANCES IN CARCINOMA OF THE UTERUS AS DETERMINED BY PATHOLOGICAL EXAMINATIONS.

BY

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(With twelve illustrations.)

THE therapeutic use of the *x*-ray for deep-lying tumors, as first recommended and employed by Perthes and Albers-Schönberg, and later by Krönig, Gauss and Lembcke (1), has now been controlled by a sufficient number of observers to make the *x*-ray acceptable as a powerful remedy in gynecology. We need no further evidence to

believe that the hemorrhages of the climacteric period and the metrorrhagias of individuals in the third and fourth decade of life can be considerably controlled, often entirely cured, by means of the hard x-ray. Von Gräff has also had satisfactory results in the hemorrhages occurring at the onset of menses. Reports in the literature have without exception been favorable concerning x-ray therapy of these functional disturbances. The action of the ray appears to be primarily upon the ovaries.

It has been further positively demonstrated by Gauss and Lemb-

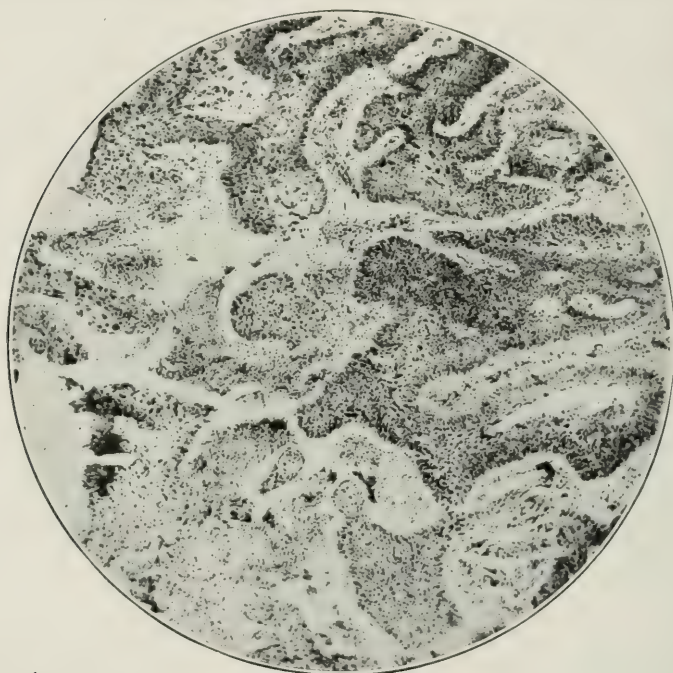


FIG. 1.—Showing a solid form of carcinoma; primary effect of the irradiation. The arrangement of the cells has been disturbed.

cke, Reifferscheid(2), Von Gräff(3) and others that not only do the hemorrhages caused by fibromyomata of the uterus lessen or cease altogether, but that the tumors often diminish greatly in size and even disappear. Besides, the intensive many field x-ray application made possible by the use of the 3-millimeter aluminum filter and the continuous water-cooled x-ray tube, can bring about very decided changes in carcinomata of the uterus or even of the ovaries and other deep-seated organs, resulting in a number of cases in an apparent cure.

At the recent International Medical Congress in London, the astonishingly brilliant reports of the Freiburg Clinic on the treatment of fibromyomata with the x-ray, the substantiation of these reports by Bumm(4) and Döderlein(5), who at the later Congress at Halle also reported similarly promising results in carcinoma of the uterus with radium and mesothorium, opened at once new and unlimited possibilities of lessening cancer mortality. Wertheim himself observes in a publication that he reconsidered publishing a report of his latest results of his radical cancer extirpation in the presence of the



FIG. 2.—Showing central cell-destruction while the marginal cells of the alveoli are still intact.

remarkable cures claimed at the Halle Congress for radioactive substance including the x-ray. It seemed at that time as if surgery was to be completely replaced by the newer deep penetration ray therapy.

The x-ray generated in the Röntgen tube and the gamma ray of the radioactive substances as radium and mesothorium have since then entered into competition with the surgical treatment of myomata and carcinomata, and we must weigh before accepting or renouncing either form of therapy, the advantages of the one against

the disadvantages of the other. The results with the Wertheim operation had been 50 per cent. of permanent cures of all operated patients. The time in which the x-ray, radium and mesothorium were used has been altogether too short for practical comparisons. Döderlein(6) used mesothorium in 152 cases of uterine and vaginal cancer most of which were of the inoperable variety. One-third of these were treated also with the x-ray. In all cases he observed some beneficial effect, even if it was only to still pain and to cause cessation of hemorrhages. Thirty-one cases remained both sub-

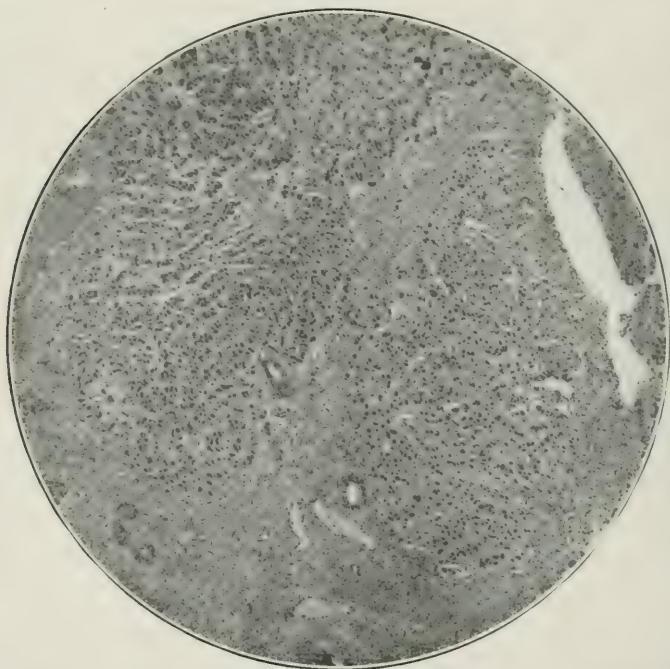


FIG. 3.—Showing smaller alveolar-type carcinoma with marked pycnosis.

jectively and objectively free from the manifestations of cancer. Several cases reported by Döderlein and Von Seuffert are striking illustrations of the remarkable effect of mesothorium on cancerous lesions which clinically would be regarded as hopelessly inoperable.

That mesothorium does induce in cancer cells certain, as yet unknown, physicochemical reactions which result in their destruction can no longer be doubted. Clinically large cauliflower growths have been known to disappear in a tolerably short time after treatment and sometimes with astonishing rapidity. The fixed uterus rendered

immovable by firm adhesions and cancerous infiltration of the pelvic connective tissues becomes under treatment movable and apparently assumes the consistency of the unaffected organ. Smaller localized surface epitheliomata of the vaginal portion of the cervix also disappear within a short space of time to be replaced by smooth, apparently healthy mucosa or smooth granulation tissue. The same effect is obtained by the use of radium. Warnekros claims that the deep x-ray application will accomplish the same result.

Without entering into the merits of the deep x-ray therapy as



FIG. 4.—Another case of carcinoma showing more decided cell change, round-cell infiltration and necrosis.

compared to the quicker results of surgical treatment, it is obvious that for the strictly scientific control of its ultimate value, it has become imperative to examine *in toto* uteri which had been subjected to the deep ray-therapy for the purpose of ascertaining (1) the actual extent of the cancerous growth in the uterus; and (2) the amount and character of cell destruction induced by the radioactive energy. In this way it will be possible to arrive at some definite conclusion with regard to the actual depth and efficacy of the irradiation. The clinical examination as to the reduction in size of the tumor or of the

improved mobility of the organ is alone not sufficient to determine the true effect of the treatment. The cancer cell nests may have invaded the deeper parts of the organ, they may even be scattered into the lymphatics and not being grouped into nodular masses, readily escape detection by the palpating fingers. These undestroyed cells can theoretically continue to propagate a new larger growth and even lead to metastasis.

Wertheim, among others, made systematic control histological examinations of the cancerous growth before treatment, and then of

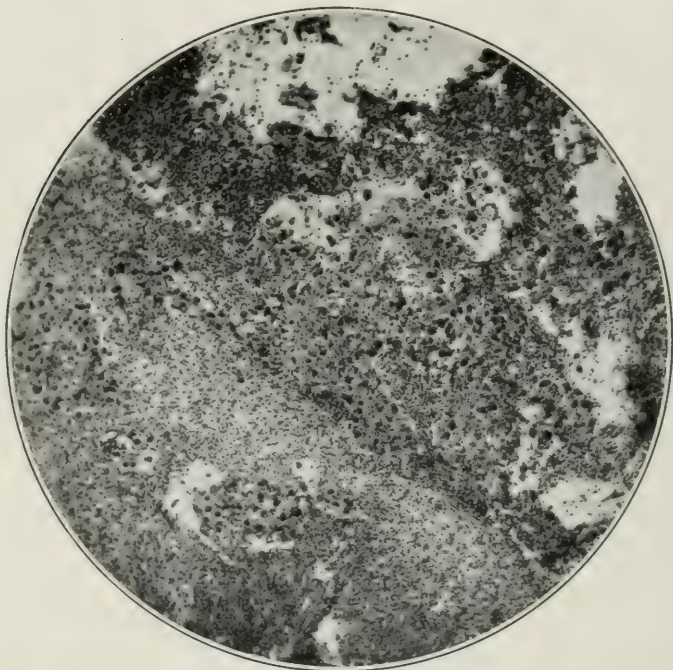


FIG. 5.—The alveolar structure is no longer present; instead there is clumping of nuclei areas of necrosis and a general round-celled infiltration.

the entire uterus and its adnexa removed by the radical operation. He was thus enabled to study both the actual amount of cancer-cell destruction and the amount of cancer growth which resisted the ray effect and remained perfectly viable. The serious difficulty in these pathological examinations is the necessity of making serial sections of the entire uterus as only by this method can satisfactory and complete histological exploration of cancer cells be carried out. This is a task, however, which is not readily to be fulfilled in the average laboratory.

The time allotted to Wertheim for the report of his results of treatment of patients with cancer of the uterus by means of radium and mesothorium was too short to develop final data as to the fate of these cases, or of the final effect on the tumor cells themselves. He treated eighteen cases in a period of two months. It is possible that his results as he himself suggests might have been more favorable had the treatment been continued for a longer period of time. This work is meanwhile continued at his Clinic as it is in a great many Clinics abroad. It is interesting to note, however, that in his

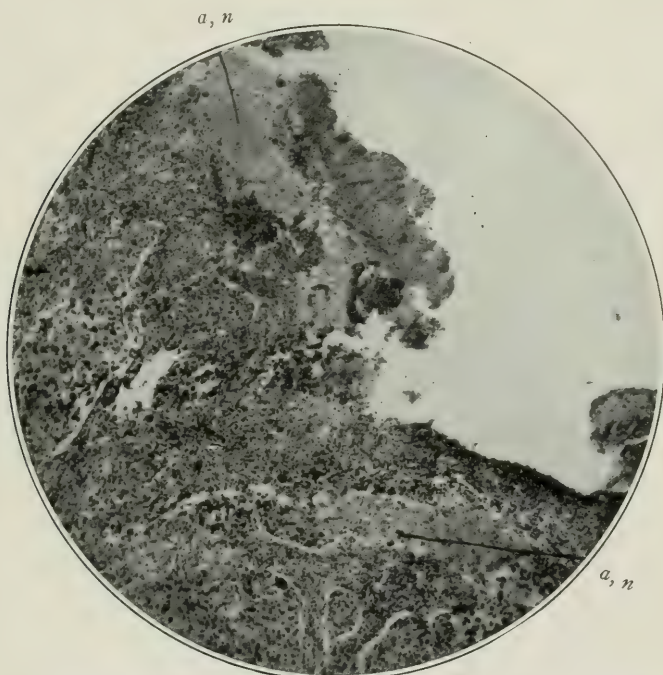


FIG. 6.—The alveoli are still indicated but in certain areas, *a, n.*, they have undergone almost complete destruction.

series of cases, the entire organ was examined microscopically. All other reports in the literature were confined for the most part to the description of excised portions of the tumor. These diagnostic excisions of tumor particles for the purpose of control are not altogether reliable because the pictures in the same case vary considerably.

Of this series of eighteen cases, Schottlaender found cancer rests in sixteen cases. In a few cases these rests were small, thus justifying the hope of certain authors that by further treatment they might

have disappeared altogether (Wertheim). Only in two cases was a complete destruction of the cancer established. This, however, was bought at the expense of extensive sloughing and fatal suppuration.

Certain authors as Wickham and Degrais, Döderlein, Bumm among others, have claimed that inoperable cases are rendered operable by means of mesothorium. Wertheim, however, found that two out of nine operable cases of cancer became inoperable through the radium treatment. The grave sloughing in these two cases, he asserts, were probably due to too large doses of

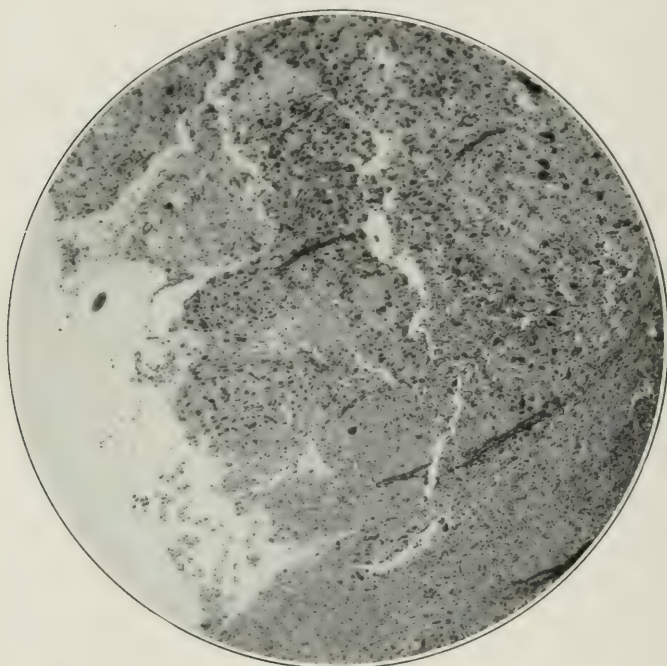


FIG. 7.—A further stage of cell necrosis.

radium employed. In the one case, a rectovaginal fistula resulted in spite of very strong filtering. In the other case a stricture of the rectum followed.

In seven cases the radical abdominal operation was performed. One was a large cauliflower growth which had, under treatment, "melted" considerably; the patient received 1700 milligram hours within seven days. The operation, however, was rendered more difficult because of a well-marked hyperemia. The microscopic examination of the uterus showed well-retained cancer rests. One

case of a very small papillary carcinomatous erosion of the anterior lip of the cervix was totally cured (5200 milligram hours in small doses). In another case of a large circumscribed cauliflower growth of the posterior lip there were found at the operation fresh multiple adhesions between the small intestine and the body of the uterus. The rectovaginal septum was infiltrated with a slimy substance; the patient died of peritonitis (20,000 milligram hours). In another case there was but slight superficial sloughing; microscopically there were qualitative changes but no quantitative results. In



FIG. 8.—A high grade infiltration of round cells where cancer alveoli are still faintly indicated.

another case still, there was a disappearance of the tumor and in its place a flat area of loss of substance; microscopically, there were partly disturbed and partly retained cancer rests. The seventh case, a very large cancer of the vagina treated by 10,000 milligram hours showed in four days a disappearance of the cancer and in its place was a flat ulcer which was reduced after eleven days to half its size; microscopically, a median sagittal section showed only traces of destroyed cancer cells and the same was seen in two cross-sections

through the right half of the uterus. The growth in this case had already invaded the paravaginal tissues.

Similar changes were seen in the three cases treated by mesothorium in varying doses of 2000, 3000 and 16,000 milligram hours.

The histologic changes as seen in the section of these cases were as follows:

In certain instances the cells showed a strikingly disturbed arrangement appearing to be loosened from their matrix. The nuclei had a decidedly marked pycnotic appearance. This was characteristic.

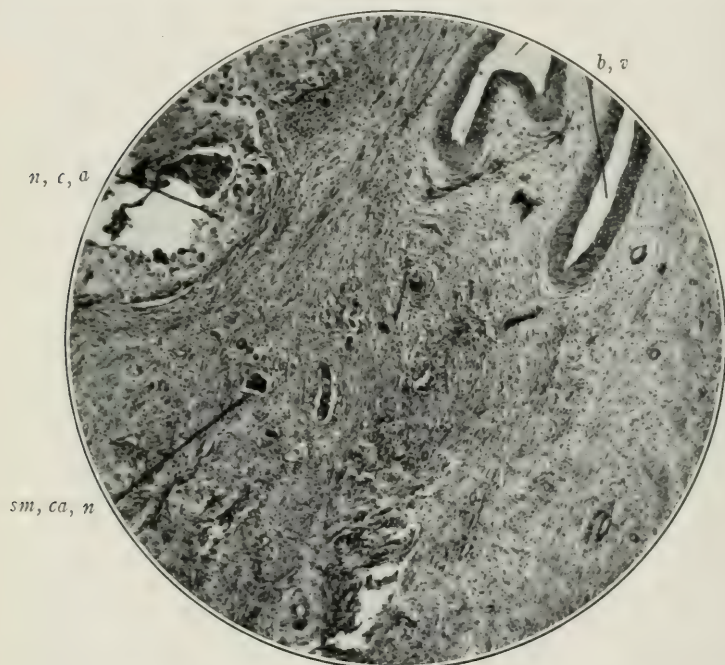


FIG. 9.—Showing definite cell destruction *n, c, a*; small cancer nests *sm, ca, n*, and two blood-vessels apparently unchanged.

Besides, the nuclei had a strong tendency to become confluent and to form conspicuously large numbers of giant cells. A further stage is the obliteration of the characteristic phalanx-like appearance of the alveoli in the solid form of cancer; the central masses of cells are commonly destroyed first; the marginal cells retain their vitality for a much longer period. In the cases treated by large doses of radium or mesothorium, there may appear in the same section areas of necrosis, areas of hyaline degeneration, areas of large syncytium resembling masses and of increased connective-tissue proliferation. (The

Van Gieson stain is here of considerable help.) In other areas there may still be small rests of unchanged cancer cells. But characteristic for all these sections is the very conspicuous amount of round-cell infiltration. This, however, is more in evidence in the cases treated by larger doses of radium or mesothorium and those treated for a longer time. *The other anatomical structures as for example, blood-vessels, nerves, cervix mucous glands appear to be for the greater part unaffected.* This it would seem should point to a stronger resistance possessed by these tissues on the one hand, and on the



FIG. 10.—A more advanced stage of cancer-cell necrosis in another case.

other to a possible specific or selective influence of the radium radiation on cancer cells. Von Seuffert (7) has shown similar effects and ascribes to mesothorium a specific, selective influence on cancer cells.

The depth to which the ray penetrates as evidenced by the morphological changes in the cells has not, as yet, for the reason above described, been established. This still awaits further study. At present there has not been demonstrated a single uterus primarily the seat of a well-marked cancer which has become entirely free of the

malignant growth. Possibly, such an effect will be successfully demonstrated in the near future. A very important desideratum is the prevention of the deleterious tissue destruction caused by the α - and β -rays emanating from radium and mesothorium and also of the secondary rays generated in the filter. The problem of devising suitable filters has been partially solved by the use of such metallic alloys as brass and bronze. These are further re-enforced by rubber sheaths and cotton or gauze packings so as to separate the radium or

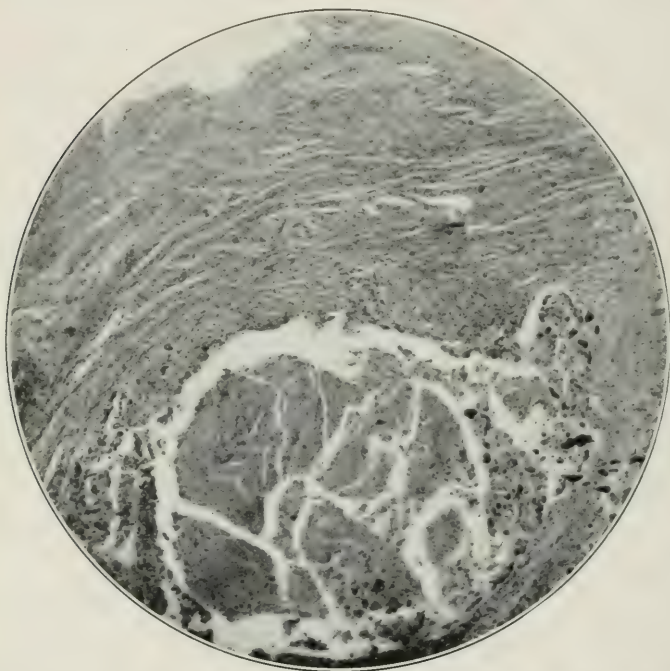


FIG. 11.—A large cancer alveolus in almost complete destruction; note the few marginal cells showing very marked pyknosis.

mesothorium capsules for a distance sufficient to prevent the burning of neighboring normal structures.

It is, however, not enough to achieve a complete cure in small surface epitheliomata. These lesions can be removed more promptly by the simple curettage, or the cervix amputation. Further research as carried out at the Wertheim 'Klinik' where the gynecologist and the gynecological pathologist both check up the results, will establish the ultimate therapeutic value of radium, mesothorium and of the x-ray in carcinoma of the uterus. At present we can accept these

measures as of value in postoperative therapy. The further development of the x -ray may render it possible to destroy metastasis in the regional glands and in remote areas. Warnekros (8) has demonstrated the same action on cancer of the vaginal portion of the cervix by the application of the anticathode over the symphysis without vaginal application. There is great hope that the x -ray will supersede radium and mesothorium not only because it is under the present circumstances more available but chiefly because the secondary bad effects may be avoided (9, 10). In any event surgeons will continue

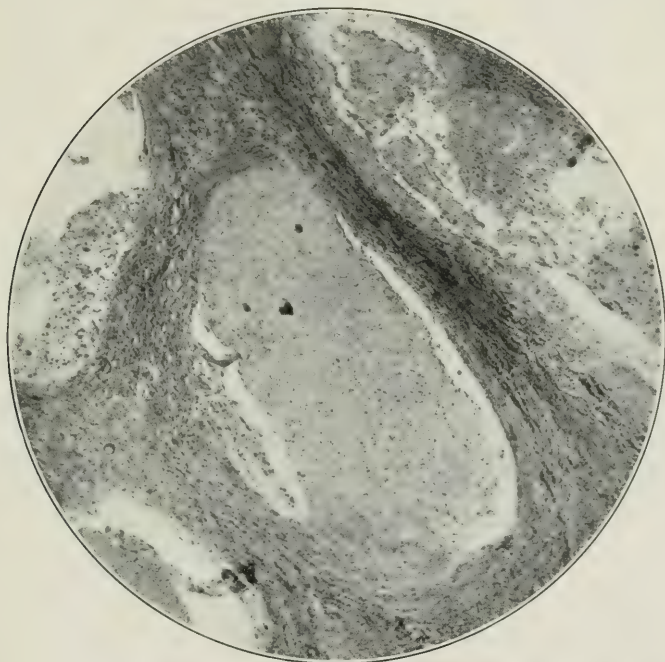


FIG. 12.—Another case in which practically all the carcinoma was destroyed.

to operate on carcinoma of the uterus and depend on the deeper radiotherapy to combat such rests of cancer which cannot be removed at operation without reducing the patient's chances for immediate postoperative recovery.

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BIBLIOGRAPHY.

1. Gauss and Lambcke. Röntgentiefentherapie, 1912.
2. Reifferscheid. Strahlentherapie, Band IV, 1914.
3. Von Gräff. Strahlentherapie, Band IV, 1914.

4. Bumm and Voigt. Munch. Mediz. Woch. No. 31, 1913.
5. Döderlein. Munch. Mediz. Woch. No. 5 and 6, 1914.
6. Döderlein and Von Seuffert. Munch. Mediz. Woch. No. 5 and 6, 1914.
7. Von Seuffert. Berliner klin. Wochenschrift, No. 51, 1913.
8. Warnekros. Berliner klin. Wochenschrift, No. 5, 1914.
9. Muller. Die Krebsbehandlung, 1914.
10. Dessauer. Zeitschr. "Fortschritte der Medizin" No. 1, 1914.

REPORTS OF TWO CASES OF POSTPARTUM INVERSION OF THE UTERUS, WITH DISCUSSION OF THE PATHOGENESIS OF OBSTETRICAL INVERSION*

BY

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(With ten illustrations.)

CASE I.—In 1908, Dr. D. A. K. Steele, of Chicago, reported a case of inversion of the uterus,[†] but did not include a detailed description of the pathological specimen. Accordingly, with his consent, the following description is given.

In order to understand the relation of the pathology to the clinical features, the essential points in the history of the case must be summarized. The patient was twenty-three years old. A normal primiparous labor attended by a midwife was followed by profuse hemorrhage after delivery of the placenta, "without much traction on the cord." Following an attempt to deliver the inverted uterus, which she mistook for the head of a second baby, the midwife called in a physician, who recognized the condition and attempted an unsuccessful reduction. A few hours later with the assistance of another physician, "the uterus was believed to have been replaced. Forty-eight hours after delivery, the uterus was again found to be inverted, protruding from the vagina and partially gangrenous." An abdominal hysterectomy was performed as soon as possible, by Dr. H. M. Richter, and the patient died of septicemia on the fourth day after delivery. At the autopsy, a small abscess was found in the abdominal wall. There were no signs of peritonitis nor of infection at the cervical stump. The walls of the uterus were found "packed with colon bacilli."

Pathological Anatomy.—Gross. The specimen consists of the corpus uteri with a very small portion of the cervix included. Its length is about 17 cm. and its greatest width about 9.5 cm., while it weighs approximately 560 gm. In the fresh state, its weight, we know, must have been appreciably greater, especially considering

* Read before the Chicago Medical Society, April 15, 1914.

† Report of a case of inversion of the uterus following delivery; with gangrene. Hysterectomy. Death from septicemia. Autopsy. *Surg., Gynec. and Obst.*, 1908, vi, 322-323.

the fact that it was kept in formaldehyde before it came into my hands. So we may safely add 50 gm. for the loss of weight due to the preserving fluid; also, the cervix no doubt weighed about 100 gm. Thus we may estimate that the weight of the entire uterus in the fresh state was approximately 800 gm. The average uterus immediately after delivery of the placenta weighs about 1000 gm.; and at the end of the first week, around 500 gm. This specimen was obtained on the fourth day after labor. Hence, assuming that the original weight was 1000 gm., it seems probable that, in spite of the inversion, involution took place at approximately the normal rate.

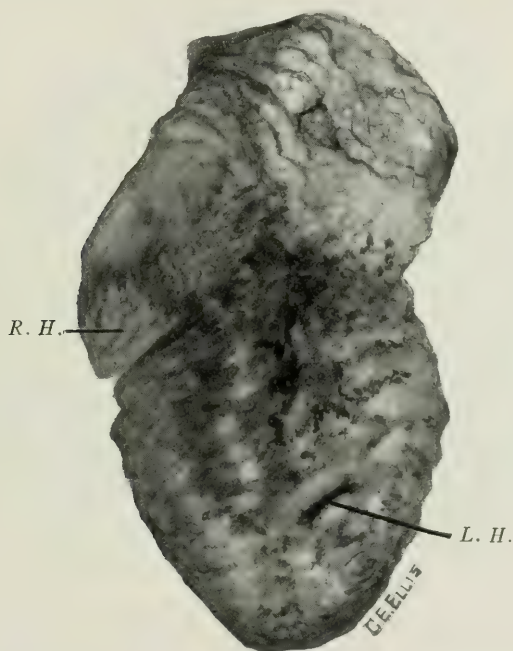


FIG. 1.—External view of the anterior surface of inverted uterus. The center of the most dependent portion is located about 1 inch to the left and somewhat posterior to the center of the placental area. *L. H.*, opening into left horn, which is not entirely everted. *R. H.*, right horn. (Compare Fig. 2, where the depression into this horn is shown.) The uterus is flexed to the left by the unequal descent of the two horns, the right one lagging behind and pulling toward its own side, the center of the descended mass. Compare Figs. 2 and 4.

The contour of the organ is the typical pear-shape, with the larger extremity hanging downward. This large lower end lies wholly within the placental area, and the most dependent point is situated about 1 inch to the left and somewhat posteriorly to the approximate center of the placental region. The color is a mottled black on a light gray background. In the recent state, the color combination must have been a bluish black in a dark red setting.

The only area of advanced gangrene in the specimen is on the posterior surface near the center, where there is a portion of tissue elliptical in shape, about 7.5 cm. long, 5 cm. wide and 3 or 4 mm. thick, in which death of tissue is complete. The color of this area is black, and the line of demarcation is well-defined. The long axis of the gangrenous portion is parallel with the longitudinal axis of the whole specimen, and the lower half of it is included within the placental area. The supply of blood in this side of the uterus presumably is as abundant as in any other portion of the organ; and

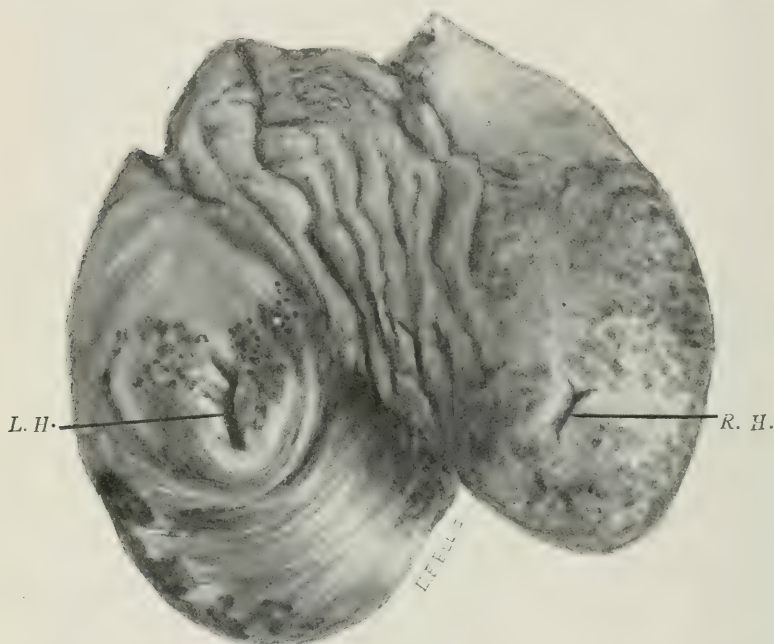


FIG. 2.—External view of the same uterus shown in Fig. 1, with the specimen flattened out, after a longitudinal incision through its posterior wall. Note the depressions, one at the left (*L. H.*) and one at the right (*R. H.*) uterine horn. The inversion of the left horn is practically complete, thus leaving only a comparatively small indentation. The depression at the right horn is much larger, due to the fact that the eversion here lacks considerable of being complete. Both of the openings are slit-like in shape with their long axes converging approximately toward the center of the fundus. The longitudinal folds at the center of the illustration are artificial, due to bending of the specimen after fixation with formalin. Compare Figs. 1 and 4.

apparently the constriction at the cervical ring would not interfere with the circulation more posteriorly than anteriorly. This gangrenous region, however, coincides with the area of pressure between the uterus and the posterior vaginal wall with the patient lying in the dorsal posture; and very likely this pressure produced interference superficially with the circulation sufficiently to induce a greater degree of necrosis here than in the other parts of the organ.

On the anterior surface of the specimen directly opposite this completely gangrenous area, is a similar region in which the process is not so far advanced. The color is not uniformly dark, and there is no distinct line of demarcation. The rest of the uterus is in an advanced stage of necrobiosis, that is, small areas of living cells are scattered about in dead tissue. All of these regressive changes are most marked at the lower end and on the anterior and the posterior surfaces of the specimen; also the mucous surface has suffered more than the serosa. This is as one would expect, because the mucosa is farther from the blood supply.

The placental area is located in the fundus distinctly nearer the left horn than the right and slightly more posteriorly than anteriorly

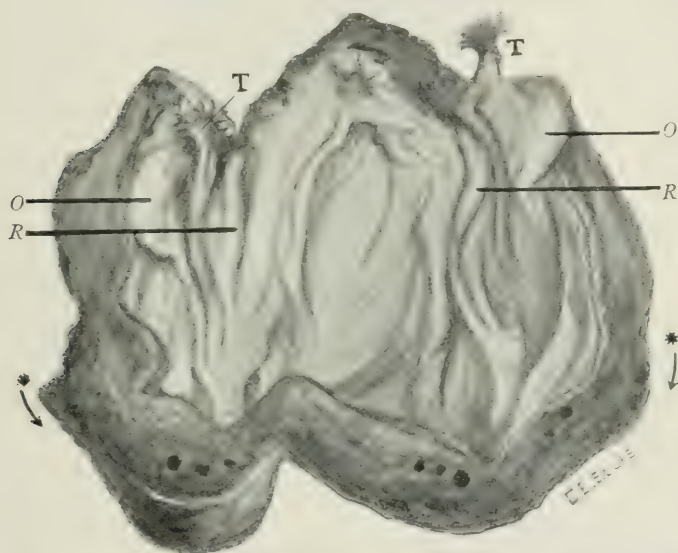


FIG. 3.—Internal view of the same uterus shown in Figs. 1 and 2, laid open by a longitudinal incision through its posterior wall. *T.*, Fallopian tube. *O.*, ovary. *R.*, round ligament. The right side of the illustration corresponds to the right side of the patient; thus the portion between the round ligaments represents the anterior external surface of the uterus before inversion. The placental area extends from the star on one side in the direction of its arrow to the star on the opposite side. Note the darker color of this area and the cross-sections of large veins filled with thrombi. Observe also that the peritoneal surface (interior of specimen) is thrown into numerous longitudinal folds.

(Fig. 3). Thus the placental region in its descent pulled down first the left horn and then the right, the latter descending ultimately not more than half as far as the left one (Fig. 1).

The depressions at the horns of the uterus are visible (Fig. 2), the right one very markedly and the left one only moderately so. The latter might easily be overlooked, especially in the living patient, with the surface obscured by blood. The right depression is about 3.5 cm. deep; the other, scarcely 1 cm. Both of these indentations

are slit-like in shape and, with the specimen folded together so that the parts lie in proper relation to each other, the long axes of these indentations when prolonged intersect at a point somewhat at the left and posterior to the center of the fundus, a spot located approximately at the center of the placental area.

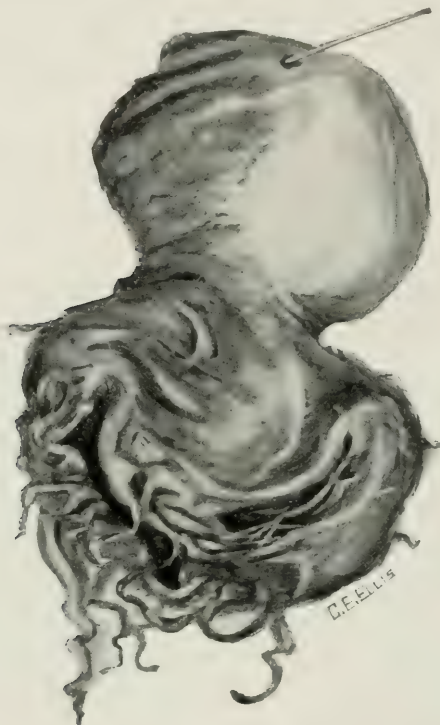


FIG. 4.—External semi-lateral view of inverted uterus with fibroid attached by a large pedicle.* This inversion was discovered about the fourteenth day after labor, and was produced by the tumor. The upper rounded portion represents the fundal portion of the corpus. The probe lies in the uterine opening of the left Fallopian tube. Note how small this aperture is, compared with the cornual depressions in a uterus on the fourth day postpartum (Fig. 2). The right tube together with the corresponding horn of the uterus was left in the patient with the cervix, and was removed later by the writer. The lower portion of this illustration represents the fibroid, which has a cavity in its interior large enough to contain several ounces. The dark areas indicate openings into this space. The shredded tags of tissue have no particular significance. The tumor is attached to the fundus not far from the right horn. Note the hour-glass shape of the specimen as a whole. Compare Figs. 1 and 2.

The cavity formed by the inversion contains all of both tubes and both ovaries and a considerable portion of the round and the broad ligaments (Fig. 3). It is an extremely rare accident for the omentum or the intestine to prolapse into the new-formed space with these

* This specimen has already been described by the writer (*Surg. Gynec. and Obst.*, 1913, xvi, 632); but this view of it was not given in that article.

other organs, while adhesions between the serous surfaces very seldom occur, even in cases of long duration. The right tube is normal in appearance, while the left one is somewhat thickened. The ovaries are practically normal, save considerable flattening due to pressure in the very narrow space. The serous surface is thrown into numerous longitudinal folds, due to the lessened area which it has to cover.

Microscopical.—With ordinary hematoxylin and eosin stains, there is little to be seen except degenerated and necrosed tissue. In a few places, nuclei are found; but they do not show the avidity of normal nuclei for hematoxylin. The rest of the tissue reacts but faintly to either stain, with the exception of rather sparsely scattered spots which are colored more heavily, due to less advanced necrosis. These retrograde changes are all more marked toward the fundus than in the cervix.

CASE II.—For this report, the writer is indebted to Dr. M. A. Swiney, Bayonne, N. J.

Patient, Mrs. F., twenty-three years old; primipara. Father, a Jew; mother, Irish. Family and personal histories negative. Pelvic measurements: external conjugate, 19.5; interspinous, 25; intercrisate 28; circumference, 96. She has been feeling rather weak for three weeks previous to delivery.

The position of the head during the early part of labor was R. O. P. With the patient under ether, the occiput was rotated into anterior position by means of forceps, and the delivery of a girl baby was accomplished easily. The cord was wound around the neck twice. The labor lasted about fourteen hours, and the pains were of only moderate severity. After waiting ten minutes, the placenta was removed by the Credé method. Since Dr. Swiney was obliged to leave early, Dr. Klein, who had given the anesthetic, remained with the patient for about an hour, on account of slight hemorrhage, and "kneaded the uterus at intervals during that time." The uterus was felt easily, and was firmly contracted at the times of departure of both doctors.

Two hours later, at 6.00 A. M., the patient was in excellent condition. Four hours afterward, at 10.00 A. M., he found her moribund, and discovered a leaking gas-jet about two and a half feet from the patient's head. The windows were closed and the odor of gas was strong. She did not rally until evening. The next day the patient was doing fairly well though she was pale and had some vomiting. She was catheterized three times during this day. The following day also she was catheterized three times; and it was noticed that the catheter pointed toward the rectum instead of passing upward under the pubes. During the next twenty-four hours her general condition improved, though there was some vomiting. Pulse, 90; temperature, 99.5. She was catheterized three times during this day.

The following day, the fourth after delivery, she was still vomiting in spite of treatment. Pulse, 120; temperature, 102. Bowels moved normally. She was catheterized three times, as on previous days. Up to this time her condition had been considered to be due

to poisoning by gas. The dark foul-smelling condition of the lochia now led to a vaginal examination. The vagina was filled with a large round tumor, and no cervix could be felt. Upon abdominal palpation the uterus could not be discovered. The diagnosis of complete inversion of the uterus was made at once. Dr. William F. Faison was called in consultation, and an unsuccessful attempt at reduction under ether was made. The patient was then taken to St. Francis Hospital, Jersey City, where a celiotomy was performed the following day by Dr. Faison. Even then, a longitudinal incision 2 or 3 inches long through the anterior uterine wall was necessary, in order to accomplish replacement. She died the following day from shock, and acute anemia following acute gas poisoning.

It was noted pathologically that the inversion was symmetrical, the peritoneal indentation being in the median line and the two horns of the uterus having descended equal distances. Thus the center of the fundus constituted the prominence of the most dependent portion of the tumor mass. Both round and broad ligaments were pulled into the cavity formed by the inverted uterus, and both ovaries lay at the bottom of the cup-like entrance to this space.

Dr. Swiney refers to the following peculiarities of the case: 1. Easy forceps delivery of the baby and expression of the placenta without difficulty. 2. No marked hemorrhage. Uterus contracted and normal in contour and position. 3. Peculiar downward direction of the glass catheter. 4. Gas poisoning; persistent vomiting attributed to this. 5. Dark foul lochia appearing on the fourth day led to an internal examination and to the discovery of a vaginal tumor, the inverted uterus. 6. Peculiar light pink color of the blood at operation.

The diagnosis would have been made earlier, if the adverse symptoms had not been attributed exclusively to gas poisoning. On account of this misleading complication, the vaginal examination was not made early.

Pathogenesis.—In a former article* the writer has treated comprehensively almost the entire subject of uterine inversion, with the exception of the mechanism. Moreover, the obstetrical inversion just described draws attention to its pathogenesis more naturally than did the case formerly related, which being due to a tumor, had a very self-evident mechanism. Furthermore, this subject has been much neglected by recent writers, and a better understanding of the method of origin of this accident will place its treatment upon a much more effective basis. Frequent references are made in this discussion to former writers because of the greater wealth of the older literature in this field. The broad grasp which obstetricians had upon this subject from forty to seventy or more years ago seems

* Jones, W. C. Inversion of the uterus, with report of a case occurring during the puerperium and caused by a fibroid. *Surg., Gynec. and Obst.*, 1913, xvi, 632-650.

almost remarkable. Crosse's monograph (1845), for example, is a comprehensive and exceedingly scientific treatise, judged even by modern standards.

As to the causes of obstetrical inversion, practically all authors both ancient and modern are agreed on the following general points: 1. The most frequent underlying cause is *pregnancy*, which includes more than 80 per cent. of all inversions. The next most common factor is uterine tumor (usually fibroid). A few scattered cases have been found which were either postmortem in origin or idiopathic, that is, occurred independent of pregnancy and without a uterine tumor or any other ascertainable cause. 2. In obstetrical inversion, the one fundamental predisposing cause is *uterine relaxation* or *paralysis*, which may be either localized or diffuse. 3. Two factors are recognized as being the chief exciting causes of obstetrical inversion, namely, *funic traction* and *fundal pressure*; the latter usually is produced by the hand of the attendant or by an increase of intra-abdominal tension due to straining efforts of the patient. 4. The mechanism of active inversion usually is described briefly as follows: After any portion of the uterus becomes indented to a considerable extent, the rest of the organ seizes this invaginated portion as it would grasp a foreign body, and in attempting to expel it, turns itself inside out.

The statements made under the four headings above, refer to widely accepted and, for the most part, well-established facts, and are repeated here only as a basis for further discussion. The pathogenesis of inversion due to tumor alone, is so self-evident that any consideration of this small group of cases will be omitted, and this discussion will be confined to inversion of obstetrical origin. In order to facilitate further handling of the subject of the mechanism of inversion, the following classification will be used (modified chiefly from Radford(1) and Duncan(2)).

- | | | |
|---------------------------------|---|-------------------------|
| 1. Passive, or Atonic Inversion | } | Reducible. |
| a. Spontaneous | | |
| b. Artificial | | |
| 2. Active, or Tonic Inversion | } | Frequently Irreducible. |
| a. Spontaneous | | |
| b. Artificial | | |

Passive inversion is that type in which the whole uterus or the greater part of it is relaxed. In the active variety, the larger portion of the organ, or all of it, is contracted, the paralysis, if present, being at most only local in extent. This distinction between passivity and activity is exceedingly important from a clinical standpoint in

determining the immediate treatment. On the basis of a large number of recorded cases, Hoover,(3) Stowe(4) and a few others have taken the position that immediate reposition is dangerous on account of shock; and they advise waiting a few hours before reduction is attempted. In assuming this attitude, however, they fail to distinguish between the active and the passive kinds. In the former, hemorrhage and also especially shock are marked, and the waiting policy no doubt gives a lower mortality.

In passive inversion, the symptoms usually are less marked, and to this group belong those rarer cases in which inversion occurs and reposition is accomplished with practically no subjective symptoms (Barrows,(5) Bell,(6) Reeve,(7) *et al.*). A further very important fact is that this flaccid condition is only temporary, and always sooner or later (usually sooner) changes to the active variety. Hence, both theoretical and clinical considerations demand, as a rule, immediate reduction of passive inversion before the cervical ring contracts and renders reposition difficult or impossible.

Artificial inversions are those in which some force external to the uterus (and usually external also to the patient) has been applied, especially traction on the cord or pressure on the fundus. The spontaneous class includes those not induced by any extraneous factor. Increased intraabdominal tension due to straining by the patient is often incriminated in this connection. More than half of all obstetrical inversions are spontaneous. Hence the importance from a prophylactic standpoint of understanding more clearly the pathogenesis of this type of cases.

Duncan's Mechanism.(8)—This writer's description, although written forty-five years ago, presents so graphically the generally accepted modern ideas along this line that I will quote his words: "The only uterine condition essential to the production of these various kinds of inversion is paralysis or inertia. This is the condition of the whole organ at the time of the production of passive inversion. In active inversion, it is accompanied by uterine inactivity, and as these cannot coëxist in the same part, the paralysis is partial and the activity partial. Action of the uterine wall cannot cause introcession of it. Activity of the whole uterus renders inversion impossible. Activity of a part of the uterus renders introcession of that part impossible. *There must therefore be paralysis of the whole or a part before inversion can begin.*" The same author says further that "before active uterine inversion can be begun, . . . introcession (of a portion of the uterine wall) must take place. Some part of the uterus must be in a position to be seized by the remainder, must be-

come, in a sense, a uterine content, acting just as a polypus does in cases of inversion in connection with this disease. Some other condition than uterine action must therefore be called in." These other factors are chiefly traction on the cord and pressure (manual or due to increased intraabdominal tension) on the fundus. He considers that the process begins in the paralyzed fundus and that in active inversion the rest of the uterus is in a state of contraction, for, "it is necessary that the activity of muscular contraction of the uterus be in a part situated below the paralyzed part. For as inversion consists in causing the descent of the fundus, . . . this cannot be effected by any uterine efforts except those made by parts below the fundus." (9) As illustrating the possibility of inertia in the higher and activity in the lower portion of the uterus, he refers to hour-glass contraction as "the most frequent exemplification." (9)

These arguments appear to be very conclusive and seem to have been accepted as final by most writers since his time. While it is true that inversion may be impossible without at least relative inertia of a portion of the uterus and although there is no doubt that some factor other than uterine action does start the inversion in many or perhaps most cases, I cannot discover an adequate basis for Duncan's dogmatic assertion that "activity of a part of the uterus renders introcession of that part impossible" and that "some other condition than uterine action must therefore be called in." It is not difficult to conceive how it may be possible for unequal contraction of the uterine wall alone, without any extraneous forces, to start an inversion.

Automatic Muscular Inversion.—The initial indentation could occur, if over a given area the outer muscle fibers should contract strongly while the inner ones remain entirely or partially inert. From a mechanical standpoint, the same sort of action occurs when a water-soaked board is exposed to drying heat on one side only. The contraction of the wood on the drying side produces a curve in the board with its convexity toward the side in which the shrinking process is slower. By referring to Figs. 5 and 6 and their legends, this argument may be more clearly understood. This theory is supported also by the following facts: Holmes (10) has called attention to the probability that in dry labor the contraction of the uterus upon the fetal prominences, especially the buttocks, may produce anemia and consequent weakness of the portions of the uterine wall thus exposed to extra pressure. One may easily conceive that this phenomenon is present to a small extent also in normal labor. Thus this impaired portion would suffer indentation more easily. Further-

more, we know that the blood supply of the uterus enters from its outer surface. Thus pressure of the uterine contents against the walls of the uterus would produce greater anemia internally than externally because the internal pressure, on account of being applied to the most distal portion of the arterial circulation, would interfere much less with the blood supply to the external surface. Thus the stronger contractions of the outer unimpaired muscle tissue would have a tendency, when other factors are favorable, to induce automatic muscular inversion.

Furthermore, if the idea just quoted from Holmes is correct, the fact that the most protruding fetal part, the breech, is nearly always in the fundus would harmonize with the fact that probably all inversions have their origin in the uppermost portion of the uterus.

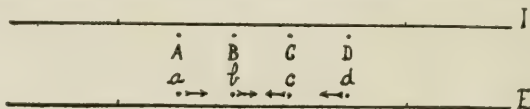


FIG. 5.

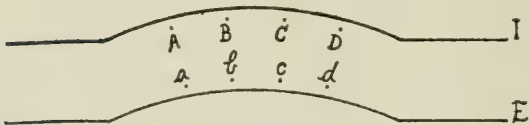


FIG. 6.

FIGS. 5 and 6.—Diagrams of a cross-section of a portion of a uterine wall, illustrating the mechanism of beginning automatic inversion started solely by muscular action. *I.*, internal surface. *E.*, external surface. *A, B, C, D*, any four isolated points near the internal surface; *a, b, c, d*, the same near the external surface. If the outer muscle fibers contract strongly, the points *a* and *b*, and *c* and *d* (Fig. 5) will be drawn toward each other, as indicated by the arrows, this action thus lessening the area of the external surface in this region (Fig. 6). If at the same time the inner fibers, in which the points *A, B, C, D* are located, react feebly or remain inert, this area of the inner surface will be relatively larger and will thus have a tendency to fold or bulge. As this cannot occur outward against the firmly contracted external fibers, it must bend inward, as indicated in Fig. 6.

A further contributing factor to this mechanism may be found in the edema which theoretically may occur in the parts of the uterus free from pressure by the fetal elevations(11). This serous infiltration might produce a slight rigidity, which would enable these portions of the wall to resist indentation.

A further conclusive argument in favor of the writer's present contention is found in the fact that inversions of the uterus have occurred in apparently normal uteri, entirely independent of preg-

nancy, without the presence of any tumor and even in the nulliparous. Thorn(12) has collected thirteen such instances from the literature, and these do not include several others which were reported prior to the earliest date covered by his tabulated cases. These instances have always seemed so inexplicable that they have been shelved merely with the label, idiopathic. The mechanism of automatic muscular inversion not only explains them readily but is the only adequate explanation yet suggested. And surely if it is possible for inversion to occur in an anatomically normal nulliparous uterus without extrauterine influences, one surely is not justified in maintaining that the same process cannot occur in a puerperal uterus where nearly every possible factor is more favorable for the occurrence of this accident.

It is noteworthy that the theory of automatic muscular inversion dovetails with the fact, which will be explained later, that most if not all obstetrical inversions have their origin in the upper uterine segment where the musculature is strong and not in the lower portion where there is a large admixture of fibrous tissue. Also, the preponderance of inversion in primiparæ where the uterine contractions are stronger than in the multiparæ harmonizes with this same theory.

In the light of these arguments, the statements of Crampton(13) and others that inversions discovered a considerable time postpartum must have occurred or at least must have begun immediately after delivery, do not seem to be founded on a substantial basis. An inversion could start far more easily a day, a week or a month after labor than it could begin in an apparently normal nulliparous uterus. Holmes(14), in referring to Beckman's views on this subject, says that "as the mechanism is more thoroughly understood less reliance is placed on the artificial causes."

Although active inversion is so difficult to reduce, it is also paradoxically true that spontaneous replacement occurs in this kind of cases, rarely if they are complete (but several undoubted instances are on record(15), very commonly if all or most of the fundus lies above the contracting cervical ring(16). Now if spontaneous reposition of complete inversion can take place through muscular activity of the uterus even many days or weeks following the occurrence of the accident and after the organ has become more or less contracted, surely it needs no stretch of the imagination to conceive that automatic inversion (Figs. 5 and 6) is possible or even probable in the large hollow contracting uterus of labor. The reverse mechanism of spontaneous reduction is precisely similar to

that of direct automatic muscular inversion, with the modification in the inverted organ of considering the mucosa as the external surface. The process of spontaneous replacement is so evident from a theoretical standpoint that Crosse, Duncan and others by *a priori* reasoning predicted its occurrence, without knowing of the few if any authentic cases that were on record in their time.

In passive inversion, the theory of automatic inversion does not apply, for in this class of cases there must be, of course, some force other than muscular contraction, both to start the inversion and to complete it, because the uterine muscle is in a state of inactivity. With these diffusely flaccid uteri, early replacement is easy and also immediate recurrence is very prone to happen; hence, in this group of cases, reduction must be maintained artificially until the uterus regains its tonus.

Funic Traction.—This is held by the best authorities to be the chief or the only exciting cause in about 40 per cent. of all obstetrical inversions; and in some instances, it seems to be effective without any predisposing factor, save the fact of pregnancy. Marx(17) describes such a case in which he was able to watch the mechanism while a 6-inch cord produced an incomplete inversion during delivery. Coiling of the cord around the baby's neck or other fetal parts may produce the same result as an abnormally short cord. This same writer relates another instance of extreme pulling on the cord in which inversion was produced by the mother, who in anger seized the baby as it was born, and tried to throw it away.

Miller(18) describes a patient of his own whom he attended in three successive labors. The first was followed by inversion. Being thus warned, he watched the subsequent ones for the recurrence of this accident. In each instance, the uterus retained perfectly its normal contour until, during the third delivery, he pulled slightly and cautiously on the cord as an experiment. As a result, the fundus began to indent; but he ceased traction at once, and the slight depression righted itself immediately. There is no reasonable doubt that inversion would have occurred, if the funic traction had been at all vigorous. These and other instances in which the results of pulling on the cord were observed during the actual traction constitute, no doubt, only a small fraction of the inversions which have occurred as a result of this unnecessary and dangerous procedure. Further consideration of funic traction will be taken up later in connection with the discussion of the placenta.

The Fundus.—This portion of the uterus is exposed more than any other to the extrauterine forces which exert pressure upon this

organ. This is the case to a large extent in the nonpregnant uterus and is still more true in the parous or early puerperal state, when the lower portion is large enough to fill the pelvis and hug the walls of the latter, thus precluding any possibility of the production of an indentation by pressure from without. Furthermore, the cervix as compared with the fundus, is relatively fixed in its position being rather securely held by its direct attachment to the bladder and to the parametrial structures. There seems to be only one anatomical fact which would predispose the inferior portion of the uterus to indentation, and that is its relative thinness. This weakness is more than offset, however, by close approximation to the walls of the rigid pelvic canal.

In active inversion, it seems mechanically impossible for it to occur unless it begins in the upper portion of the uterus; for with the indentation commencing below, diffuse contraction of the upper uterine segment would tighten the walls and obliterate the intra-uterine space thus holding the corpus unyieldingly firm, and in this manner would prevent the completion of the process. If the depression starts at or near the fundus, the remainder of the organ contracts upon this invaginated portion and accomplishes the inversion easily, as already described.

Even in passive inversion, where the whole uterus is flabby, in all reported instances in which the process has been observed while it was actually taking place, the writers invariably describe the first introcession as occurring at or near the fundus. The same is true when inversion recurs immediately after reposition. Meigs(19), Holmes(11), Bacon(20) and many others have replaced a completely relaxed inverted uterus, only to have the fundus, not the cervix, follow the hand downward again as soon as withdrawal was attempted.

The two forces which exert external pressure upon the fundus are the hand of the obstetrician, or his assistant, and increased intra-abdominal tension. Many writers have described cases in which there could be no reasonable doubt that the inversion never would have occurred if an unnecessary or an unreasonably rough massage of the fundus had not been employed or if a Credé expression had not been attempted upon a relaxed uterus. Such obstetric errors are well authenticated and usually are inexcusable. In Long's(21) case, the observations were very convincing, the inversion being caused no doubt by the pressure of an assistant's hand on the fundus; and an early diagnosis was made both by intrauterine and abdominal palpation. Probably about 10 per cent. of all obstetrical

inversions may be laid at the door of improper manual manipulation of the fundus.

Increased intraabdominal tension is caused by straining efforts on the part of the woman, most frequently either in an attempt to assist in the delivery of the placenta or during defecation. Even coughing, laughing, etc., have been given by some writers etiological dignity in this connection. Marx(17) and many others have described instances in which the first symptoms of inversion occurred while straining at stool, usually several hours to several days postpartum. Whether one maintains that the entire inversion occurred suddenly during the act or that there had been a partial inversion ever since delivery and that it merely was completed at this time, makes little difference. From either viewpoint, the inverting power of augmented intraabdominal pressure is evident; and considering the known possibilities of automatic inversion in the nonpathological nulliparous uterus, one is justified in maintaining that perhaps the entire inversion was due to the straining effort.

In this connection should be considered Taylor's mechanism, that is, inversion beginning by eversion of the cervix, thus progressing from below upward. *A priori* reasoning, anatomical facts and clinical observations all unite to disprove this theory: the protected and the relatively fixed position of the cervix have already been referred to; no cases have been reported in which this mechanism was observed while it actually was occurring; in many if not most obstetrical inversions, the cervix remains uninverted and thus in these instances surely could not be the starting point of the process. In placenta previa, according to Holmes(11), we have positive evidence that the inversion always begins in the fundus, in spite of the well-established fact that the placenta is an exceedingly important factor in localizing the inception of an inversion within the area of its attachment. These observations together with positive anatomical facts and reliable clinical data which demonstrate beyond doubt the predilection of the fundus as the starting point of inversion, have all combined to overthrow Taylor's theory.

The Reverse of Taylor's Mechanism.—This is a very useful procedure; for in numerous instances, by means of beginning the replacement by tucking back the cervix first, reposition has been accomplished readily when pressure on the fundus had been of no avail. Quite possibly this fact has led some to the erroneous conclusion that the reverse proves the positive. The thinness of the lower uterine segment allows it to yield to pressure more readily than the thicker upper portion. This is true after the inverted corpus has drawn the

cervix downward and away from its protecting pelvic wall. With the uterus back in its normal position, the same would be true if any inverting force could gain access to a position between the lower uterine segment and the pelvic wall.

There is another and probably more important mechanical reason why reduction begun at the cervix is more effective than when started at the fundus. Radford(8) has put it briefly thus: "If we could press the fundus upward, and thereby dimple it within itself, we should find ourselves opposed by a double inflexion, for the body would be grasped by the os uteri and the fundus would be within the body." In other words, by this method four layers of



FIG. 7.



FIG. 8.

FIG. 7.—Diagram of the most common type of inversion of the uterus. Observe that a large portion of the cervix is not involved in the process.

FIG. 8.—Diagram showing that four layers of the uterine wall must pass through the cervical ring when reposition is begun at the fundus. Thus six layers of the wall of the uterus (1, 2, 3, 4, 5, 6) lie opposite each other at the upper end of the vagina. Note that it is necessary for at least a portion of the cervix (1 and 6) to remain uninverted in order that this complex reduplication can occur. Compare Fig. 10. The arrow indicates the position of the reducing force. Compare also Fig. 9.

uterine wall, two of the corpus and two of the upper cervix, must be pressed through the ring formed by the uninverted portion of the cervix (Fig. 8), making in all six layers of uterine wall which lie opposite each other while the corpus is being forced through the cervical ring. If, on the other hand, reposition is started at the cervix, only two thicknesses of uterine wall are included at one time within the cervical constriction (Fig. 9), allowing at most only

four layers of the wall of the uterus to lie opposite each other at any stage of the reduction.

This feature concerning the smaller number of layers of uterine wall within the grasp of the cervix in the reverse of Taylor's mechanism does not apply, of course, to incomplete inversions in which the fundus has not passed through the external os nor to complete inversions, including the entire cervix. In the latter instance, the cervix is not folded upon itself, so that whether replacement is begun at the fundus (Fig. 10) or at the cervix (Fig. 9), in either case only two layers of uterine wall pass through the cervical ring at one time.

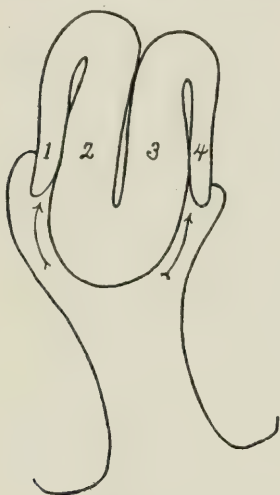


FIG. 9.

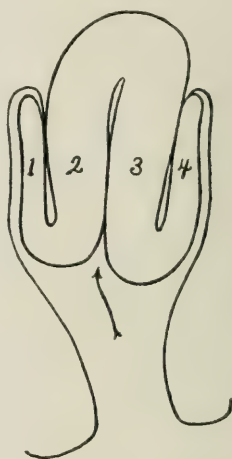


FIG. 10.

FIG. 9.—Diagram illustrating the necessity for only two layers of uterine wall to pass through the cervical ring when replacement is begun at the cervix (as indicated by the arrows). By this method only four layers of the wall of the uterus (1, 2, 3, 4) are apposed to each other. Compare Figs. 8 and 10.

FIG. 10.—Diagram showing reposition begun at the fundus when the inversion is *complete including all of the cervix*. In this instance, the number of uterine layers forced to pass through the cervical ring (two) and the total number of layers opposite each other (four) are the same as when reduction is started at the cervix. The arrow indicates the position of the replacing force. Compare especially Fig. 9; also, Fig. 8.

Thus in this type of complete inversion, the only advantage of the cervix as the starting-point for replacement is the greater thinness of its wall. The greatest difficulty in beginning reposition at the cervix is the fact that this portion of the uterus being the highest in the vagina is not always easy of access. Very little complaint, however, is made in clinical reports in regard to this point. Although many authors do not make clear the extent of the involvement of the

cervix, most inversions, as far as the writer can ascertain, are "complete," *not including the entire cervix*. If this is true, the above considerations are very important on account of the great frequency of their application. It should be noted further that this discussion is pertinent only when the uterus, or at least the cervix, is more or less firmly contracted. With uteri which remain flaccid, reduction started at the fundus is accomplished with perfect ease.

Some clinicians give the advice to start replacement at one of the horns of the uterus. The apparent reasonableness of this suggestion may be seen by referring to Fig. 2, L. H., where there is already a depression 2 or 3 centimeters deep, due to incomplete inversion of this corner of the uterus. However, as soon as the cervical ring is encountered the difficulty arises already alluded to, of forcing four layers of uterine wall through the cervical opening.

The Ascent of the Cervix.—When the introitus vaginæ is small, the fundus descends into the vagina but does not pass on outside the body, the process being completed by the ascent of the cervix, which arises stretching the vaginal wall upward until the lower end of the uterus finally occupies approximately the original position of the fundus. This feature of the mechanism which occurs in some cases of inversion is of considerable clinical importance. Crosse(22) cites such an instance in which a very competent observer was deceived for a time by mistaking the ascended cervix for the fundus. Others have related similar experiences, the error being due usually to lack of careful abdominal palpation; for usually the smaller size of the cervix and the cup-like depression in it are readily recognized, if one has in mind the possibility of the occurrence of inversion.

Frequently the uterus goes to an extreme in the opposite direction passing entirely outside the vulva, also producing occasionally more or less inversion of the vagina.

The Placenta.—This organ plays a very important rôle in producing inversion. It acts in three ways, as follows: 1. By interfering with normal hypertrophy, it produces a weak place in the uterine muscle corresponding to the area of placental attachment; 2. by its mere weight, it produces traction upon this relatively weak spot; 3. this pulling is enhanced if the placenta is adherent. Adherence is explained best by uterine inaction; for the separation of the placenta probably is due mostly to muscular contraction. Thus uterine inertia acts in a dual capacity both by weakening the already impaired placental area and by enabling the placenta to adhere and thus prolong its traction unduly. In a case described by Barbour,(23) the placenta was attached along a portion of one edge,

and beginning inversion was found postmortem at this spot in the uterus, due without doubt to the dragging of the afterbirth. Numerous other cases of this general nature have been reported.

The location of the placenta, however, is its most important feature as a factor in the pathogenesis of uterine inversion. We have already explained how the fundus is exposed more than any other portion of the uterus to many of the most important causes of inversion. Now if at the same time the placenta is located in this most vulnerable region, it is evident that by this coalition of factors the probability of the occurrence of inversion is greatly increased. Moreover, in support of these theoretical considerations there is an abundance of clinical evidence; for in most inversions the placenta is still attached; and in every instance in several hundred reports in the literature consulted by the writer, when a statement was made in regard to the situation of the placenta it was always said to be at or near the fundus.

Placenta previa also sheds some light on this problem. Holmes(8) has shown in several cases collected by him that all the clinical data point unmistakably toward a fundal origin of the inversion, in spite of the fact of the low position of the afterbirth. The predilection of the fundus as the starting place for inversion is thus clearly demonstrated and the rarity of inversion following placenta previa also is explained in large part at least by the same fact. Thus it is seen that the location of the placenta, exceedingly important as it is in producing inversion, is not an entirely indispensable factor. In fact, no single etiological point can be considered a *sine qua non*, not even uterine inertia. At the same time, there can be no doubt in regard to the truth of the statement of Holmes(11) that "the more distant the placenta is from the internal os, other conditions requisite existing, the more probable is inversion to occur."

Parity.—The part played in inversion by the parity of the patient has always seemed hard to explain. In 108 cases, Cross found that 67 per cent. occurred in primiparæ; in 176 instances, Crampton discovered 50 per cent. in primiparæ; and in twenty-four instances, Stone reported 67 per cent. as first births. This makes an average of 53 per cent. in 308 inversions. Furthermore, statistical evidence shows just as reliably that the greater the parity of the mother the less liable she is to inversion. In order to appreciate the significance of these statistics, one must recollect that only one-fourth to one-third of all births are primiparous. Hence if parity had no influence in producing inversion, only one-quarter to one-third, instead of one-half to two-thirds, of all obstetrical inversions should occur in

primiparæ. As far as the writer is able to discover, the chief if not the only cause to account for this unequal distribution is the location of the placenta, because funic traction, fundal pressure and all other similar factors are just as likely to be present in one patient as in another. As stated previously in this article, low insertion of the placenta and placenta previa are decidedly more common (not only absolutely but also relatively) in multiparæ, while high implantation, which as already explained favors inversion, is more frequent (relatively) in primiparæ. Hence, the disproportionate number of inversions occurring in connection with first births.

There still remains, however, a great incongruity in this connection, namely, that inertia, the most important cause of inversion, is far more common in multiparæ than in primiparæ. Expressed in mathematical form, the sequence is thus: Multiparity = inertia = inversion = primiparity. There seem to be only two explanations of this inconsistency: either inertia is not the all-important predisposing cause that it has been held to be or some other element in addition to it usually is necessary. That there is at least one other factor there is no doubt and that it consists in the preponderance of fundal location of the placenta in primiparæ is equally certain, as already explained. In regard to uterine relaxation, the more I study the mechanism of inversion the more I am inclined to discredit somewhat the exclusiveness which inertia has enjoyed as the sole predisposing cause of all inversions. As Radford(8) pointed out so long ago, more or less relaxation of the cervix may be necessary in every case in order to allow the corpus to pass through. On the other hand, McIntosh(24), Radford(8) and very many others have described inversions which have occurred during violent or "explosive" pains, clinical observations which seem to demonstrate "a power inherent in the uterus itself to become inverted." These data would seem to require such an explanation as automatic muscular mechanism (Figs. 5 and 6); and this theory applies especially to uteri which have not been impaired by previous labors and which are therefore still in possession of their pristine vigor. This mechanism surely offers a most reasonable explanation of a large proportion of the 54 per cent. of spontaneous obstetrical inversions.

Nervous influences are held by Crampton (8) to be the chief cause of all obstetrical inversions and also the factor which determines their greater frequency in primiparæ, because in the latter, he maintains, emotional disturbances are more marked than in multiparæ. He calls attention also to the greater frequency of eclampsia in primiparæ and to his belief that inversion is increasing in frequency in recent

years. Both of these observations together with the predisposition of primiparæ to inversion he holds are all due, chiefly at least, to undue nervous excitement. This theory is rather intangible and never has received wide acceptance.

SUMMARY.

1. The great predisposing cause of obstetric inversion, according to most authorities, is uterine inertia. The two chief known exciting causes are funic traction and fundal pressure. Case I very likely belongs in this group.

2. More than one-half of all obstetric inversions are spontaneous. Case II is an excellent illustration of this class. The usual explanation for these cases has been the assumption that increased intra-abdominal tension has produced undue pressure upon a relaxed uterus. In many if not most instances of spontaneous inversion, the uterus is in a state of contraction; in these cases, this explanation cannot apply. Hence, the writer urges the acceptance of the theory of automatic muscular inversion. It is favored both by theoretical deductions and by clinical observations.

3. Most if not all inversions begin at the fundus (Case I and Case II) largely because this portion of the uterus is exposed most to the forces which produce inversion, especially to external pressure; on the other hand, the cervix is protected anatomically from extra-uterine forces.

4. Reduction of obstetric inversion usually is accomplished most easily by beginning at the cervix. This is true both on account of the greater thinness of the lower uterine segment and also because by this method, in most instances, less uterine tissue is forced through the cervical ring at any given moment. If the uterus is firmly contracted, it is safer to delay reduction for a few hours, on account of shock; but if relaxation is marked, immediate reposition is indicated, before the cervix contracts and thus renders replacement difficult or impossible.

5. In certain instances of inversion in which the cervix ascends high into the abdomen, care must be taken not to mistake the cervix for the fundus. The smaller size of the former and the cup-like depression in it constitute the chief points of differentiation.

6. The placenta favors inversion by causing less marked mural hypertrophy in the area of placental implantation, by traction due to its mere weight, by adherence caused through uterine relaxation, and by its location; the nearer it is to the fundus the more likely it is to cause inversion.

7. Primipræ are predisposed to inversion more than multiparæ chiefly on account of the high insertion of the placenta in the former. Also, the greater vigor of the uterine muscle in its first labor may favor automatic inversion. Uterine relaxation cannot be the chief or sole cause of inversion, otherwise this lesion would be more frequent in multiparæ where inertia is more common.

As a final statement concerning the pathogenesis of obstetric inversion as a whole, it seems necessary to caution against assigning too much importance to any one factor. The causes are many and the ways in which they act are manifold. Therefore, each element should be given its proper place in the ensemble, and our ultimate aim should be the improvement of the curative and more especially the prophylactic treatment of this unfortunate accident.

REFERENCES.

1. Radford, T. Case of inversion of the uterus with remarks. *Dublin Med. Jour.*, 1837-38, xii, 7-25; 215-224.
2. Duncan, J. M. *Researches in Obstetrics*, 1868, 374-398.
3. Hoover, A. R. Accidental complete inversion of the uterus. *Jour. Am. Med. Assn.*, 1912, lviii, 633.
4. Stowe, H. M. Discussion. *Surg. Gynec. and Obst.*, 1913, xvi, 718.
5. Barrows, C. C. Acute incomplete inversion of the uterus. *AM. JOUR. OBST.*, 1910, lxi, 488.
6. Quoted by Barrows.
7. Reeve, J. C. A case of inversion of the uterus without constitutional symptoms. *AM. JOUR. OBST.*, 1887, xx, 140.
8. *Loc. cit.*
9. Duncan. *Loc. cit.*
10. Holmes, R. W. Inversio uteri complicating placenta previa; etiology and mechanism considered. *Obstetrics*, 1889, i, 297-311.
11. Holmes. *Loc. cit.*
12. Thorn, W. Zur inversio uteri. *Samml. Klin. Vortr., Leipzig*, 1911, No. 625 (*Gynäk.*, No. 229), 101.
13. Crampton, H. E. Complete inversion of the uterus following parturition. *AM. JOUR. OBST.*, 1885, xviii, 1009-1024; 1146-1175.
14. Holmes. *Loc. cit.*
15. Waterfield, W. H. Acute inversion of the uterus; spontaneous reduction; recovery. *Brit. Med. Jour.*, 1893, i, 1109.
- Meigs, C. D. *Treatise on Obstetrics*, 1867, 609-623. (Describes 3 cases.)
- Other instances might be cited.
16. Johnstone, R. J. A case of chronic inversion of the uterus; with remarks on the mechanism of reinversion. *Brit. Med. Jour.*, 1909, i, 946.
- Parker, W. K. Inversion of the uterus. *St. Louis Clinique*, 1909, xxii, 335.

Numerous other cases are on record.

17. Marx, S. Inversion of the puerperal uterus; a clinical report. *Am. Gynec. and Obst. Jour.*, 1897, xi, 415-422.

18. Quoted by Stone, W. S. Acute inversion of the uterus following parturition, with report of a case. *AM. JOUR. OBST.*, 1898, xxxviii, 208-217.

19. Meigs, C. C. *Treatise on Obstetrics*, 1867, 608-623.

20. Bacon, C. S. Unpublished discussion at meeting of Chicago Gynecological Society, Dec. 20, 1912.

21. Long, J. W. Placenta previa. *AM. JOUR. OBST.*, 1896, xxxiii, 42-45.

22. Crosse. *Loc. cit.*

23. Barbour, A. H. F. The atony and the relations of the uterus during the third stage of labor and the first days of the puerperium. *Edinburg Med. Jour.*, 1884, xxx, 22-237; 313-322.

24. McIntosh, T. M. Complete inversion of the uterus treated by abdominal section. *Med. Record*, New York, 1893, xlv, 176.

15 EAST WASHINGTON STREET.

WHEN, UNDER THE PRESENT CODE OF MEDICAL ETHICS, IS IT JUSTIFIABLE TO TERMINATE PREGNANCY BEFORE THE THIRD MONTH; WHAT SHOULD OUR ATTITUDE BE TOWARD A PATIENT UPON WHOM A CRIMINAL OPERATION HAS BEEN PERFORMED; WHAT SHOULD BE OUR ATTITUDE TOWARD THOSE SUSPECTED OF THE PERFORMANCE OF CRIMINAL OPERATIONS?*

BY

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Mr. President and Fellows of the Obstetrical Society of New York and Members of the Philadelphia Obstetrical Society:

It is my privilege to open the discussion upon the very important question which you have chosen for our consideration. Aside from the therapeutic indications for the induction of abortion, than which there are few questions in obstetrics of greater importance, we have to consider the unjustifiable or criminal interference with pregnancy, a subject which has engaged the attention of master minds in past generations. It is evident that time will not permit more than

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a cursory treatment of the various questions involved. In other words the writer can hope but to touch the high places, leaving the details to be dealt with by those who shall subsequently discuss the subject.

Before this audience it is not necessary to argue regarding the sacredness of the life of the unborn. As scientists we are agreed that one should undertake the therapeutic abortion with just as much hesitation as he would commit justifiable homicide, since we realize that, in each and every interference with pregnancy before viability, we are destroying actual life and that abortion is therefore homicide, justifiable, we believe, under certain conditions, but homicide nevertheless.

It is impossible to answer the first question of the subject in a specific and final manner since, in a given case the decision for or against the employment of the therapeutic abortion will depend upon certain generalizations, interpreted by the personal experience of the physicians in charge of the case. It is impossible to so crystalize our imperfect knowledge that iron-clad rules may be established by which this decision as to the justifiability in a given case may be reached.

We may, however, make the following statement 'as a working hypothesis. *Abortion is justifiable first, when the mother is in danger of losing her life or health if the pregnancy be allowed to continue, because of some pathological condition directly dependent upon the pregnancy itself; and second, when the continuation of the pregnancy threatens an aggravation of an independent pathological condition, which will eventually destroy life or health, even though neither is actually threatened at the time the interference is proposed.* In other words we are in favor of a wide latitude always provided that the decision be made by a man, or better, and this for many reasons, by men who by their experience are qualified to make such a decision righteously.

The justification for the above attitude is based on the inherent right of self-preservation possessed by the pregnant woman in common with all other human beings, which right she is by no means obliged to resign in order to attempt to bring into existence a merely possible life. Statute laws give the individual the right to protect his life at the expense of another adult life if necessary, and therefore the life of the unborn child may be sacrificed if, to use an old common law term, the life of the mother is in duress through the child *in utero*. It is needless to call attention to the fact that in by far the greatest number of cases in which therapeutic abortion

may be justifiably considered the life of the child is forfeited, if the intervention be not practised, and that therefore in these cases there is really a conservation of life by the destruction of the unborn child.

Before resorting to the therapeutic abortion there should always be a consultation and the decision should rest entirely upon physical signs and such other demonstrable data as may be available and but little attention should be paid to the subjective symptom-complex.

The pathological conditions which may at times present a clinical picture somber enough to justify abortion may be briefly mentioned as follows. Vomiting, if truly uncontrollable and associated with progressive emaciation, after all medicinal means have been exhausted including rectal alimentation. This is the most important indication met with in point of frequency at this period, and it may be said that here it is of the utmost importance to err on the safe side and when in doubt, to induce. Cardiac disease may very rarely be an indication during this period in the presence of signs of failing compensation. Tuberculosis in its early stages or when a quiescent focus may be diagnosticated may also be an indication. If advanced, however, the child's life should be considered of paramount importance. In very rare cases of anemia therapeutic abortion may be indicated but as a rule viability may be awaited. Chorea may also be an indication though the few cases in the experience of the writer have demanded intervention at a later period. It may be mentioned that the operation is not justified at the present day to meet indications presented by contracted pelvis, atresia of the soft structures, pelvic tumors or incarcerated uterus.

What should be our attitude toward the patient upon whom a criminal operation has been performed? Let it be understood first of all that the denunciatory generalizations in the remainder of the paper are not intended to have reference to the isolated cases of pregnancy in the very young, or indeed to any case of true rape with pregnancy as a sequel, no matter what the age of the woman may be. While the author believes firmly that the only standard is that based on the sacredness of life as such, he is nevertheless willing to condone a criminal operation in certain rare instances. He has included this statement in this discussion with some misgiving lest it be misunderstood. Nevertheless he feels that it is necessary to mention this matter since cases of this type are almost invariably cited as an argument against what some consider a too sweeping limitation of the employment of abortion. This matter, however, is entirely academic; opinions on this point are negligible since

these harrowing cases form but an infinitesimal part of the criminal abortions performed. To relieve a child or a woman of an illegitimate pregnancy which is the result of a rape is one thing; it is quite another to advocate the sophistry that the same deliverance should be extended to a complacent cohabiting partner on the ground that the preservation of her good name is of more value than the fetal life. In other words, our duty is to condemn the performance of this operation absolutely except on therapeutic grounds. We need not fear that by so doing we deny the chance of relief to the occasional type referred to above. There can be but one attitude for the conscientious physician. On both scientific and moral grounds a crime has been committed no less in enormity than infanticide. Whatever opinion the laity may choose to hold on this matter, the physician can have no doubts of the truth of this statement, and the correct attitude is not maintained if he does not express at some time during the conduct of the case this opinion to the patient. How often is this done?

Should all criminal abortions be reported to the officers of the law? Not under the present methods of legal procedure, since the mere reporting of an abortion will be of no value to the community. We submit that the doctor is not an officer of the law; he is not a detective and he has no business to assume any such function. He has just the same responsibility in this matter as has any citizen who knows from hearsay that a crime has been committed and in ordinary felonies it is not recognized as the obligatory duty of a citizen to make a report to the police. It may not be amiss to note here that there is no legal penalty for silence and until by special enactment the reporting of criminal abortions is made obligatory, as is the case with contagious disease, there can be none. Call this misprision of felony if you will. The mere use of sonorous terms does not alter facts.

It must be realized that this is a very different matter from the refusal to testify before a properly constituted court of law. A physician cannot claim legally that the knowledge which he has gained in his professional capacity is privileged, and so refusal to testify might subject him to discipline for contempt.

The request which has been made by police officials that all criminal abortions be reported to them is ludicrous in the extreme since if this were done and any attempt were made to investigate them, there would, under present conditions, be chaos produced in police circles without beneficial result to the community. It is quite true that if it were possible to create an attitude in the medical

profession which would result in the reporting of even the majority of these cases, and if the police were prepared to make a real investigation of each it might then be possible to curb this crime by legal means and under these circumstances the duty to report would be absolute, but this is purely fanciful since no law can be enforced, even if enacted, unless supported by the community, and in this instance no such law could be enforced without a degree of co-operation on the part of the medical profession which is seemingly impossible.

The writer holds that, while in every case of criminal abortion, a deplorable and a despicable crime has been committed, that the duty of the physician under the existing laws and popular attitude is to hold sacred the facts which he has acquired in a professional capacity and by so doing to conserve the interest of the individual patient, not because he desires to shield a criminal, but for the reason that any other course will not result in any general good to the community at large, and will cause useless shame and suffering on the part of the patient and innocent relatives. On the other hand, when the woman is in danger of death and is willing to aid by her statements the prosecution of the particular abortionist responsible, there is then good and sufficient reason for a report in that there is a possible advantage to the community in the attempted conviction. But these cases form but a small part of the whole since serious complications develop in but the very small minority, the majority of abortionists at the present day being more or less imbued with the principles of asepsis, while the expert among them can operate as safely as the best legitimate surgeon.

A consideration of this phase of the subject would not be complete if the duty of the physician to himself were not made plain. It is a recognized principle that, in making a decision as to the propriety of the therapeutic abortion, there should be a consultation of physicians in order to share the responsibility and also that there may be no suspicion of wrong doing. In dealing with a criminal case, at least outside of hospitals, it would be much safer to follow the same plan since otherwise there is a chance, as in a case known to the writer, that an evilly disposed woman might make serious trouble for a perfectly legitimate operator. The courts have wisely held that the patient in a criminal abortion is not an accomplice, since it is a well-founded rule of evidence that the testimony of an accomplice must have substantiation. This necessity for substantiation would defeat the ends of justice and therefore the ruling just referred to. It is thus evident how the testimony of

an evilly disposed woman might damage an innocent physician, who had legitimately operated after a criminal operation had been done by another. While this is theoretically true there does not seem to be any great danger of such an actual happening since the charge would either be that he did the criminal operation or else that he was an accessory after the fact. From the first of these charges, a physician is, if innocent, protected by the rules of evidence since actual commission of the crime by him must be proved, while as to the latter, the meaning of the term accessory, in so far as it relates to cases of abortion, has not as yet been determined by the courts. The importance of the consultation is, however, that with it no action would ever be brought, while without it, though in all probability an innocent man would not be convicted, yet such a one might be occasioned financial trouble and mental anguish.

What should be our attitude toward abortionists?

If we value our own private honor and the honor of the profession of medicine, there is but one attitude possible for us, namely, to avoid any association, even if itself legitimate, with these vermin. We cannot of course recognize them as members of an honorable profession. It goes without saying that we cannot admit them to any official relationship, if we desire to retain our self-respect. If there be suspicion aroused regarding a member of any of our medical societies the matter should be sifted and guilt or innocence established.

These panderers to human lust, these debased murderers, whether skulking in the slums and plying their stinking traffic in secret for a pittance or openly defying the laws of God and man in the well-appointed operating room, form the most ghastly blot upon a profession whose general accomplishment of its ideals is second to none. As criminals they are more debased and much more blameworthy than the murderers in our prisons. With many of the latter it is possible, the provocation being realized, for a right thinking man to have a feeling of pity, sometimes even of sympathy, but for these foul, hired butchers there can be nothing but the most loathing contempt. The activities of any one of them in active practice puts to the blush the work of the most fiendish killer of modern times. This is no exaggeration, there is not a trace of hyperbole in the statement. While we have no dependable data as to the actual frequency of this crime, since no statistics available nearly approach its true magnitude, no one of experience can doubt the truth of the above statement.

Shall we have dealings in any but one way with this wretchedly

debased clan which one author has called "the disgusting caudal appendage of the medical profession."

Gentlemen, the profession of medicine is not blameless in this matter. Until the profession of medicine can be brought to the proper moral elevation there is little that can be done. While medical men, who would either be afraid to perform these operations or who honestly are aghast at the idea of doing such crime, are willing by open statement or guarded suggestion to point the way to such accommodation, or are willing, even if by veiled hints, to assure a cordial reception to the patient immediately subsequent to a criminal interference, they must consider themselves as accessories to the crime of abortion.

Should the medical profession attempt to secure the conviction of the professional abortionist?

The detection of crime is a matter for the police. It is not the duty of the medical profession to attempt the legal control of this matter. Let the police and the courts attend to their business, and let us attend to our own, by attempting to create a proper medical and public conscience in this matter. This does not mean that whenever we have definite proof we should hesitate to place it in the hands of the authorities, and moreover it is not intended to belittle the activities of those in the medical profession who feel that they have a vocation which may only be fulfilled by the hunting down of this special type of criminal. The conception of the writer is that it is the duty of the medical profession to attempt to create an enlightened public conscience in this matter. This is much more important than is the attempt to run to earth the individual abortionist since unless the former is possible, the latter is a waste of time. It is to be remembered that we are not combating ordinary crime, repugnant to the public in general, but that we are fighting an evil which is enshrined in the affections of a very large portion of the community and which is not considered as evil by them.

The laws at present on our statutes are ample, the police and the courts as well as the legislatures of the various states are for the most part anxious to combat this evil, but the difficulties met with in the detection of this crime seem sometimes unsurmountable, since, unlike the ordinary homicide, the subject of this crime, the fetus, cannot, while the moral accomplice, the woman, as a general rule will not give testimony. Even in fatal cases the law is compelled to refuse at times to convict, even if there be no real doubt of the guilt of the accused, because the legal evidence is not sufficient. This

is a necessity, since if the attitude of the courts were different there would be no doctor safe from blackmailing attempts.

Can it be that there is no remedy for this evil? Shall the United States by the wanton murder of the unborn move toward a certain decadence? In the agitation concerning criminal abortion which took place during the later years of the nineteenth century, the cry for help of some of the protestants was to the church, and some of the writers of those times were hopeful that the church could by its ban do much toward the suppression of the evil; but the gradual change of the times renders it very doubtful whether the influence wielded, at least by the denominations other than the Roman Catholic, would be sufficient to effect any appreciable impression. We therefore are compelled to turn to some other field of influence and it seems to the writer that this is presented by education along scientific lines. It will be remembered that under the Common Law, abortion was never considered a serious offense if done with maternal consent before quickening, and the destruction of the child even during labor, if any portion of its body besides the umbilical cord still remained within the birth canal, was not infanticide. It is true that it was considered an unlawful act after quickening, and that if the mother died it was murder. Thus in 1672, Sir Matthew Hale stated that "If a woman be quick with child and any one gives her a potion to destroy the child within her, and she takes it and it works so strongly that it kills her, this is murder; for it was not to cure her of a disease but unlawfully to destroy the child within her; and therefore he that gives a potion to this end, must take the hazard, and, if it kills the mother, it is murder." The conception was therefore that before quickening there was no real life to be considered, that the child was really *pars matris viscerum*, and that its destruction at this period of pregnancy was but a venial matter. Gradually the scientific and legal conception underwent an evolutionary development as evidenced by the dictum expressed by Mr. Justice Coulter in the early part of the nineteenth century that "it is not necessary that the mother have quickened to constitute the crime of committing abortion; it is not the murder of a living child which constitutes the offense but the destruction of the gestation by wicked means and against nature. The moment the womb is instinct with embryo life and gestation has begun, the crime may be perpetrated." And finally we come to our own period when both scientifically and legally we are of one mind that the life of both the embryo and the fetus is sacred and that any interference is murder.

But while this is the proven scientific belief, the large mass of the

women of to-day have no such creed but still hold firmly to that which was originally the universal and very convenient opinion, namely, that there is no life before quickening, and that therefore before this period an abortion is but a minor offense. One who needs confirmation of this statement has only to suggest to the woman anxious for relief from the duties of motherhood, that she wait until the child is born and then kill it. The horror expressed at such a suggestion will satisfy the most doubting that the women of the twentieth century with all their intelligence and relative emancipation have no conception of the enormity of the contemplated crime in that they do not consider feticide in any way akin to infanticide. This lack of knowledge appeals to the writer as the crux of the whole matter, in so far as mitigation or possible cure is concerned. There are but two causes which lead a woman to attempt or submit to criminal abortion, one the avoidance of shame and the other the avoidance, for any one of a million reasons, of the duties of legitimate motherhood. It may be that the girl whose good name is in the balance would not be hindered by the knowledge that she is consenting to murder, since her reputation is more to her than life itself, but such knowledge would certainly be potent to the many married women, who to-day recount their induced abortions as calmly as they do their menstrual history and request the destruction of their unborn children upon the most absurd pretexts.

If then by proper teaching, and here preparatory school biology is competent to help greatly, we can convince the women of the next generation as to the presence of actual life from conception onward, the writer believes that we will do more to curb this national evil than in any other way. The law is powerless to even control, much less prevent and no campaign by the medical profession along any line but that of education will be found available. It is useless to attempt the control of this evil merely by the prosecution of individual abortionists, since, as has been said, the introduction of asepsis renders the operation in the hands of the skilled abortionist as safe as it is in the hands of any expert surgeon, and therefore it is a very difficult matter to gain the evidence needful for conviction. As we all know there are numbers of moral degenerates in the medical profession who gain their livelihood by this abominable business, and to-day, thanks to asepsis, many of these men can operate without hindrance for long periods of time. We know many of them but we could not prove them abortionists to the satisfaction of any court of law. The only weapon we possess is

that of education and the responsibility for agitation to this end rests primarily with the medical profession.

Finally, let it be noted that this education cannot be given at the time when a distracted woman is facing the loss of her reputation or when a married woman is clamoring for abortion upon grounds which seem to her to be adequate. It must be a matter of early training; it must be so taught that a girl will grow up firmly convinced that feticide destroys the life of a child just as really and in exactly the same degree as does infanticide.

We are living in a period in which the dissemination of knowledge is more widespread than at any previous time in the history of the world. Subjects are discussed, more or less intelligently, by the women of to-day of the existence of which their mothers were in ignorance. If, as we believe, the present dissemination of sexual knowledge will work ultimate good to the community, we can look forward to the same result if this vital question be also illumined for the instruction of the public.

1731 PINE STREET.

A CALCAREOUS SHELL IN THE EXTERNAL ILIAC VEIN TWENTY YEARS AFTER PUERPERAL PHLEBITIS.

BY

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MRS. X., aged fifty-nine, had had thirteen children and after one of the labors, twenty years ago, there had been septic phlebitis involving the right leg, thigh and groin. There had been much disability for many years following, but the return circulation of the extremity had gradually become practically normal. There were many symptoms which might have been due to the lacerations of the pelvic floor, to cholecystitis, etc. Recurrent appendicitis required operation in February, 1914, and she entered the Presbyterian Hospital. After the removal of the appendix an exploration of the pelvis was done. There was an entire absence of chronic adhesions, peritonitis or chronic salpingitis; the right broad ligament tube and ovary being entirely free and readily manipulated. At the base of the broad ligament in front there was noted a moderate varicose dilatation of the veins and deep down a hard body, beginning near the femoral ring.

In order to expose this body the peritoneum was dissected off beginning at the side of the parietal incision. It was found to lie within the wall of the external iliac vein which it did not entirely encircle; being shaped like a long peanut shell or half cylinder, con-

vex toward the operator. There was no connection with the ureter. The vein was traced in both directions away from the calcareous shell. The removal of the latter was not attempted as it would have involved the ligation of the main vessel and serious obstruction to the blood stream was not then present.

The patient was a large woman with very lax abdominal walls, so that the retroperitoneal dissection presented no difficulty and did not interfere in any way with the subsequent healing of the incision.

The very serious and long-continued disability which may be caused by the occurrence of phlebitis of the higher veins of the lower extremities is emphasized by this case.

Surgeons have learned to dread the occurrence of postoperative phlebitis even where no infection can be traced. It often results in discomfort and swelling of an extremity which does not entirely disappear for several years.

Gynecologists are quite familiar with the phleboliths which are found in the female perineum and lower pelvis, no doubt the result of old injuries and inflammation. They are encountered during operations as round smooth balls, embedded rather loosely in the perineal structures. When in the neighborhood of the ureter, their differentiation from ureteral calculi requires skilful use of the x-ray and catheter.

In turning them out of the tissues I have never seen hemorrhage follow, as though they were in an open vessel. They are encysted, although they may represent a clot which was within a vessel at one time.

In the case under consideration the blood apparently gradually reacquired a passage through the vein and past the obstructing mass of inflammation which gradually was shaped by the passing stream; before or after calcification occurred no one knows.

The x-ray did not demonstrate this shell satisfactorily owing to its location and the size of the patient.

1831 CHESTNUT STREET.

THE CLINICAL MALIGNANCY OF PSEUDOMUCINOUS CYSTADENOMA OF THE OVARY.

BY

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HOWEVER useful the anatomical criteria of the malignancy of a neoplasm may be, when we come to an estimation of the destructive powers of cystadenomata of the ovary this form of classification utterly fails us. The nonpapillary variety of pseudomucinous cystadenoma of the ovary is by all authorities admitted to be one of the most benign of all ovarian cysts. (We do not propose to include the papillary variety in this discussion at all; its tendency to malignant degeneration is well known.) Yet this type of adenoma can cause death just as surely and just as swiftly as an adenocarcinoma.

Pfannenstiël claimed that two-thirds of all ovarian cysts were of this variety. A description of their structure may be found in any text-book—a cyst wall of connective-tissue lined with a single layer of high cylindrical epithelium, the contents varying from a thick gelatinous consistency to that of a thin syrup. They usually are multilocular, grow slowly, and may attain enormous size. In about 98 per cent. permanent cure is obtained by operation. However, in $1\frac{1}{2}$ to 2 per cent. a symptom complex arises in which the patients die with the picture of pelvic carcinoma (Pfannenstiël). This percentage does not include those cases in which an incomplete oophorectomy was done, nor those in which the disease occurs in the remaining ovary (2 per cent.). He claimed that "metastases" occurred only by implantation, their site being either within the abdominal cavity or in the scar in the belly wall. That there is a third method of spreading, namely, as true metastases carried to distant organs by means of the circulatory system, seems to have been established in a more recent contribution to the literature (*vide infra*).

The implantation metastases in the abdominal wall are not of great clinical significance unless they undergo a carcinomatous degeneration. Such cases are outside the bounds of our present discussion. We propose to adhere strictly to those tumors which re-

tain absolutely their histologically simple and benign structure. The one form of tumor extension which is of clinical importance is by intraperitoneal implantation. This occurs after either spontaneous or traumatic (puncture) rupture of the cyst with extravasation of its contents into the peritoneal cavity.

Implantation growth does not necessarily follow upon extravasation of cyst contents. The important fact is that it may. The viability of the extravasated cells must vary with the individual tumor. While some will continue to proliferate steadily and rapidly, others seem to die off. Lewitsky lays stress upon the condition of the patient at the time of operation. He says—"as a study of the literature shows, the result of operative treatment depends directly upon the general condition of the patient; that is to say, those cases end fatally in which the rupture of the cyst occurred long before (operation); in which the presence of gelatinous masses has called forth marked changes in the peritoneum and the intraabdominal organs, and due to which a certain degree of cachexia has already been acquired."

The older literature is somewhat unsatisfactory owing to the lack of differentiation between pseudomyxoma peritonei and true pseudomucinous cystadenoma. E. Fraenkel reports a fatal case of pseudomucinous cyst with general abdominal implantation. He suggests dropping the term "pseudomyxoma peritonei" and instead to speak of rupture of a pseudomucinous cystadenoma of the ovary with peritoneal metastases. While many of the early cases reported as pseudomyxoma peritonei probably belong in this category, it is more satisfactory to exclude them and to consider only the proven cases.

Polano reports the case of a woman sixty-three years of age; a left oophorectomy was done for a cystic tumor partially adherent to the intestines. Surrounding the tumor there was gelatinous material on the peritoneum. During the separation of adhesions the cyst ruptured; the extravasated material was sponged away. The right ovary appeared normal. For two and a half years the patient remained well. Then, after a fall, she noticed increasing size of her abdomen. There were also anorexia, dysuria, and obstipation. Examination showed a pelvic tumor reaching down into the culdesac of Douglas, and ascites. At operation there was much ascitic fluid with many gelatinous masses all over the abdominal cavity. The right ovary was the site of a cyst the size of a child's head. After removal of the cyst the pelvic peritoneum was seen to be covered with various sized gelatinous masses. These were also

found on the peritoneum of the under surface of the liver. As many of the masses as possible were removed. Eight days later a secondary laparotomy had to be done for ileus due to adhesions; this was followed in twenty-four hours by the death of the patient.

In summing up he remarks that in spite of the fact that there were gelatinous masses on the peritoneum at the time of the first operation, the patient remained well for two years. However, a tumor developed from the other ovary and after trauma this seemed to have ruptured. Was the last condition found a continuation from the gelatinous masses left behind at the first operation, or a new process springing from the remaining ovary? He inclines to the latter view. He concludes—"two pseudomucinous cystadenomata develop independently; both rupture—consequences from rupture of the first are hindered by timely operation—rupture of the second causes severe irreparable damage in the peritoneum. Would it not have been wiser to remove both ovaries at the first operation?" Histological examination showed only pseudomucinous cystadenoma; nowhere any malignant degeneration.

We have recently encountered a case on the Second Gynecological service at Mount Sinai Hospital very similar to Polano's, except that the patient was a very much younger woman.

Lizzie S., aged twenty-three, unmarried, Surgical Number 126,178, admitted October 28, 1911. Menses began at thirteen, regular every four weeks, duration seven days, flow moderate with slight pain. Three months before admission she had a fall and began to bleed per vaginam one week ahead of time; this flow lasted three or four days. Since then she has been bleeding every two weeks. She had abdominal cramps for one month, and right iliac pain for a week. Some headache; no vomiting; urination normal, bowels constipated. She first noticed an increase in the size of her abdomen one week ago.

Examination showed the abdomen protruding, tense, and almost entirely filled by a nontender cystic mass, its surface somewhat irregular. The mass extended from the pubis to two fingers above the umbilicus, and from the right flank to the left nipple line. On November first a laparotomy was done by Dr. Florian Krug. Median hypogastric incision extended around and above the umbilicus because of the size of the tumor. The abdominal cavity contained a slight amount of free fluid, slightly bloody, and an enormous cyst springing from the left ovary. In the delivery of the cyst some of its loculi were ruptured. This part of the cyst wall had been strangulated by being caught in a hole in the omentum. This portion of the omentum was subsequently resected. The extravasated fluid was at once sponged away, the pedicle ligated, and the cyst removed. The right ovary was normal in appearance. Ab-

domen closed by layer suture. Specimen: multilocular cystic tumor weighing 7 pounds, reddish and whitish in color, with gelatinous contents. Pathological report: "multilocular pseudomucinous cystadenoma. In places the hypertrophy is so great that the picture is almost that of a malignant adenoma."

Convalescence was uneventful and the patient left the hospital apparently well in two weeks. She continued to feel perfectly well for almost two years. On August 18, 1913, she was admitted with the following history. Since operation her menstrual periods had been perfectly regular until two months ago. Since then she had bled irregularly at frequent intervals. For four weeks she had some bleeding daily; for three weeks she had dull aching pain in the right lower quadrant of the abdomen, and again noticed an increase in its size. No vomiting, bowels regular, no urinary disturbance. Her general condition was only fair; appearance somewhat anxious and worn; hemoglobin 82 per cent. Examination revealed an elastic fluctuating mass reaching from the symphysis to two fingers above the umbilicus; small vaginal cervix, slightly softened; the uterus could not be made out.

From the time of admission until operation the temperature ranged from 100 to 102, the pulse from 100 to 120. On August 21 a second laparotomy was performed by the writer. An incision was made through the old scar. The peritoneum was found much thickened and congested; there was considerable clear, amber-colored ascitic fluid. A large cyst was found springing from the right ovary. Before any attempt at delivery of the cyst it was noted that there was a ragged spontaneous tear into its lumen close to the pedicle with glairy gelatinous contents exuding. The cyst wall was everywhere smooth, and as there were no adhesions it was easily delivered, its pedicle ligated and cut away. The intestinal serosa was markedly congested; there were numerous small gelatinous cystic masses all over the peritoneum, especially in the pelvis. It was obviously impossible to remove these and the abdomen was closed without drainage.

Specimen: smooth multilocular cystic tumor 25 cm. in diameter; 5 cm. from the pedicle there is a ragged linear tear into the lumen of the cyst exposing several loculi. Pathological report: "pseudomucinous cystadenoma of the ovary." Pulse and temperature remained normal after the operation and the patient was able to leave the hospital in two weeks. The wound was firmly healed, she felt well, and the abdomen was flat and without signs of ascites; nor was anything abnormal to be palpated bimanually.

Five weeks later I saw her at her home. She had been forced to take her bed within three weeks after leaving the hospital by increasing size of her abdomen, nausea and vomiting, obstipation, and progressive weakness. She was pale and emaciated, suffering intense abdominal pain, and markedly dyspneic even in a semi-reclining posture. Her abdomen was enormous and in marked contrast to the general emaciation. There were all the classic signs of a huge ascites. The abdomen was tapped with a trocar and

canula and six quarts of bloody fluid withdrawn. This procedure relieved the dyspnea and enabled her to retain more substantial food. Unfortunately the relief was only temporary and in spite of a second tapping she died two months after operation with the picture of a malignant ascites. A postmortem was refused.

It is obvious that the rupture of a few of the loculi at the removal of the first cyst had nothing to do with the subsequent formation of a cyst on the other side. This was undoubtedly an independent process. It is most remarkable that such a huge tumor should develop in the course of two years from an ovary whose macroscopic appearance had been judged normal by a very experienced operator (Dr. Krug). Yet repeated clinical experience has shown that this is not infrequently the case. This raises the moot question as to what we should do with the second ovary on removing one which is the seat of a tumor. The safest thing for the life of the patient would be to remove both ovaries. Yet this is not for a moment to be considered as a routine procedure. Where a unilateral ovarian tumor presents gross evidence of being malignant, or where it shows marked papillomatous changes, the consensus of opinion favors the removal of the other ovary. Where such is not the case what shall be our method of procedure? The ideal course to pursue would be to remove a wedge-shaped piece of any suspicious portion of the second ovary and have the pathologist make a frozen section thereof before the abdomen is closed. However, unless we removed several such sections from every part of the ovary, we might readily miss the very portion which contained a beginning cystadenoma. In a young woman desirous of bearing further children we should hardly be justified in removing the second ovary even if the microscope showed a beginning anatomically benign cystadenoma. It might take many years for a tumor to develop therefrom, years in which the patient would have all the benefits of normal functioning ovarian tissue with the possibility of repeated pregnancies.

It would seem therefore that the most rational procedure would be to subject every patient who has had a unilateral oophorectomy for ovarian tumor to a subsequent careful bimanual examination at least every six months. This should be carried out for several years. In this way we can be saved from a needless sacrifice of ovarian tissue. Any newgrowth developing from the remaining ovary would be discovered in time and the risk the patient runs would be merely that of a second oophorectomy; this would be comparatively slight if the operation were undertaken before perforation or other complications had supervened.

In our case, had the patient presented herself for readmission when she first noticed symptoms (two months before she applied for aid) her life could very probably have been saved. It seems most unlikely that the spontaneous perforation which was found had occurred more than a few weeks before operation; her active symptoms antedated the second operation by only four weeks. At any rate, a systematic bimanual examination at intervals of six months following the first operation would surely have revealed the second growth at a time when it could have been removed with great certainty of affecting a cure.

No discussion of this subject would be adequate without mention of the truly remarkable case of Nicholson and Pick (*Ueber lokale Destruktion und multiple Lungenmetastasen beim Pseudomucin-kystom des Eierstockes*). They did an autopsy on a woman of sixty; she had a large pseudomucinous cystadenoma of the left ovary whose histologic structure was entirely benign. In spite of this it caused an extensive local destruction of the cervix, extending by continuity into its substance in exactly the manner of a carcinoma. Both lungs were studded with extensive metastases which retained all the typical histologic characteristics of pseudomucinous cystadenoma of the ovary. Nicholson justly concludes, "In whatsoever way one may interpret the conception of clinical or anatomic malignancy, there can be no doubt after our findings that the ordinary pseudomucinous cystadenoma of the ovary can occasionally show a true malignancy in every sense of the word."

Here then we have a well-authenticated case in which an ovarian cyst of entirely benign histologic structure extended in a destructive manner into adjacent tissue, and deposited multiple true metastases by way of the blood stream in distant organs. This case seems to be unique in the literature, and such an occurrence is of sufficient rarity to lose somewhat in clinical import. However, the assumption of local intraperitoneal malignancy (if one may be permitted to coin such a phrase) once the cyst contents have passed beyond the confining wall of the capsule, is doubtless of far more frequent occurrence than is generally realized. What applies to pseudomucinous cystadenoma in this respect, applies with even greater force to all other ovarian cystadenomata. This teaches an important lesson in their treatment. They should be attacked through an incision sufficiently large to permit of their removal intact, whenever this is at all feasible. Any attempt to remove a cyst through a small incision by first reducing its size by incision or puncture is to be condemned. No matter how carefully the field of operation be packed

off, the extravasation of cyst contents into the peritoneal cavity is always a possibility and the result may, in time, be fatal. This has now been very generally recognized by gynecologists and the procedure practically abandoned by them. Unfortunately there are general surgeons who still resort to it. The advantages of a small incision over a large one are not for a moment to be weighed in the balance against the possibility of spreading a potentially malignant neoplasm. Of course there are cysts so huge that it is impossible to remove them intact; but such cases are very rare in these days.

The same objections which apply to the small abdominal incision apply with equal force to the vaginal route in the treatment of ovarian cysts. This route should be utterly abandoned except where cysts are so small and movable as to insure their removal intact. Indeed the increased manipulation necessitated by the vaginal technic greatly increases the chances of the unintentional rupture of even a small cyst. There are certain cases of ovarian cyst complicating pregnancy which form an exception to this rule, but they need receive no further consideration here.

In giving a résumé of five years of work in the laboratory of the Second University Frauenklinik at Vienna, Schottlaender has recently stated that one-third of all the proliferating ovarian neoplasms they encountered were frankly carcinomatous. We have seen the potential malignancy of those that are histologically benign. There can be but one conclusion—the early removal by laparotomy of every ovarian tumor as soon as it is diagnosed. Only something in the general condition of a patient which would render operative interference hopeless should be made a contraindication; even this should lead to postponement rather than abandonment of operation.

Treatment by Röntgen rays or radioactive substances need be mentioned only to be condemned. Its most ardent supporters have admitted that its use in ovarian cystomata is both ineffectual and dangerous.

CONCLUSIONS.

1. One-third of all proliferating ovarian tumors are frankly malignant, the other two-thirds are all potentially malignant.
2. The final estimation of malignancy must be clinical.
3. The usual method in which histologically benign tumors cause death is by perforation of the capsule, extravasation of contents, and peritoneal metastases.

4. Every ovarian tumor should be removed by laparotomy as soon as discovered, unless there be an absolute contraindication to operation.

5. Whenever at all feasible, cysts should be removed intact, without attempt at reduction in size by puncture.

6. When spontaneous rupture of a cyst has occurred, the earlier the operation the better the prognosis.

7. In removing a unilateral ovarian cyst, other than one which is frankly malignant or one which shows extensive papillomatous changes, the other ovary should be left *in situ* if its macroscopic appearance be normal.

8. Every patient who has had a unilateral oöphorectomy for cystadenoma should be subjected to a periodical reexamination for disease of the remaining ovary.

BIBLIOGRAPHY.

- Baumgarten. *Virchow's Archiv*, vol. xcvi, p. 1.
 Bertino, A. *Ginecologia Firenze*, vol. vi, p. 321.
 Fraenkel, E. *Muenchener medizinische Wochenschrift*, 1901, No. 24.
 Glockner. *Archiv für Gynaekologie*, vol. lxxx, No. 1.
 Guenzbuerger. *Ibidem*, vol. lix, p. 1.
 Hennig. *Muenchener medizinischer Wochenschrift*, 1902, p. 1223.
 Lewitsky. *Monatschrift für Geburtshülfe und Gynaekologie*, vol. xiv, p. 490.
 Lippert. Inaugural Dissertation, Leipzig, 1905.
 Martin, A. *Krankheiten des Eierstockes*.
 Nicholson, G. W., and Pick, L. *Zeitschrift für Geburtshülfe und Gynaekologie*, vol. lxiv, p. 252.
 Pfannenstiel. *Veit's Handbuch der Gynaekologie*, 2nd edition, vol. iv.
 Polano. *Monatschrift für Geburtshülfe und Gynaekologie*, vol. xiii, p. 734.
 Schlottlaender. *Zentralblatt für Gynaekologie*, 1913, No. 42.
 Sutton, J. B. *Journal of Obstetrics and Gynecology of the British Empire*, 1908, vol. xiii, p. 108.
 Wendeler. *Monatschrift für Geburtshülfe*, 1896, No. 3.
 Werth. *Archiv für Gynaekologie*, vol. xxiv, p. 100.
 Westermarck and Annel. *Zentralblatt für Gynaekologie*, 1890, p. 450.
 Westphalen. *Archiv für Gynaekologie*, vol. 59, p. 632.
 Zaengerle. *Muenchener medizinische Wochenschrift*, 1900, p. 414.
 67 WEST EIGHTY-NINTH STREET.

TRANSACTIONS OF THE NEW YORK AND PHILADELPHIA OBSTETRICAL SOCIETIES

Joint Meeting held in New York City, March 10, 1914.

DR. HOWARD C. TAYLOR, *in the Chair.*

DR. WILLIAM R. NICHOLSON, of Philadelphia, presented the following address:

WHEN, UNDER THE PRESENT CODE OF MEDICAL ETHICS, IS IT
JUSTIFIABLE TO TERMINATE PREGNANCY BEFORE THE THIRD
MONTH; WHAT SHOULD BE OUR ATTITUDE TOWARD A
PATIENT UPON WHOM A CRIMINAL OPERATION HAS
BEEN PERFORMED; WHAT SHOULD BE OUR
ATTITUDE TOWARD THOSE SUSPECTED OF
THE PERFORMANCE OF CRIMINAL
OPERATIONS?*

DISCUSSION.

DR. HENRY C. COE.—“I had the pleasure of discussing this subject before our Society four years ago when the legal side was ably presented by Mr. Vandiver. To-night, however, we have listened to an excellent paper on what may be called the practical side of the subject. I think that every one here to-night will admit that he is very often placed in a position with regard to the question of abortion, where it is exceedingly difficult for him to refuse to do what he knows is not right. At least that has been my experience and I know that many practitioners with the highest reputation are urged to interfere with pregnancy by women who plead all kinds of excuses. One patient has ‘heart trouble,’ one is threatened with ‘kidney trouble,’ another is too nervous, etc. We must therefore continually be on our guard. Dr. Nicholson was perfectly right when he said that the remedy lies in the elevation of moral standards among doctors if we expect to reform the laity. As medical teachers we have a fruitful field in the moral education of our students. We can accomplish very little by giving perfunctory advice. One of the most curious psychological phenomena observed in this connection is the apparent want of moral tone among women, even of the highest character, with regard to this question. I believe that most women are exceedingly lax in their ethical views of abortion and I have had

*For original article see page 1004.

some extraordinary propositions made to me by ladies, who in other respects are of the highest type. Not only do they firmly believe that a criminal abortion in the early weeks is not wrong, but they seem to take it as a matter of course and expect that you will look at it in the same light. There are others who will assent to all the objections which you may urge, yet with the inconsistency of the sex, affirm that their case is exceptional. My own plan has been to practise diplomacy, instead of at once giving a flat refusal, persuading the patient to wait until the second month and then with a little more persuasion to induce her to wait until the third, when she usually becomes resigned to the situation. I think that it will take two or three generations to train women so that they will appreciate the true ethical standard. At present we must do the best we can with the patients we have to deal with. I have found that there are three types of women: those who will endure anything in order to have a child, those who have had a very difficult labor the first time and who see no reason why they should assume the risks of a second, while the third class absolutely refuse to have children and are not open to any arguments. As regards our legal responsibility, I may cite in illustration the following case: It was my misfortune in one instance of criminal abortion in which I tried to save the patient's life, to have had a very narrow escape from being indicted for manslaughter at the hands of one of the grotesque coroners who have made this city a travesty on justice. This was reported at length in a previous discussion to which allusion has already been made. This experience and that of several of my friends, has made me cautious about accepting the sole responsibility in such cases. At that time I made a careful study of the law bearing on this subject and was positively assured by experts in medical jurisprudence as well as by the District Attorney, that we are not obliged to report a fatal case of criminal abortion before death, except with the consent of the patient or her family. I myself can see nothing to be gained by antemortem statements, at least as the law is administered in this community. The pigeon holes in the District Attorney's office are filled with records of fatal cases all substantiated by ample evidence, which will never come before a jury because it is certain that a conviction cannot be obtained. We have never succeeded in getting but one offender and that was by a rather disreputable plot. At this moment, after serving a term in jail, he is again in practice in my own neighborhood. Another point which we must always bear in mind (although this is a side issue when the saving of life is involved) is our own reputation, since the 'yellow journals' thoroughly enjoy abusing the medical profession if given this opportunity. No man is safe, and in the daily performance of our duties we must be careful that we are not professionally ruined, or at least gravely compromised. Two of my friends have not only been arrested, but locked up without bail simply for attending a young woman who had become septic after a criminal abortion. One of these gentlemen's reputation was almost blasted, his pockets depleted and for several weeks an indictment was hanging over his head. This may happen to any of

us. I do not know how we are going to reach the abortionist, whether through professional channels or by legal means. As Dr. Nicholson says, they are often skillful aseptic operators. The crux of this question, after all, as the reader properly concludes, is not in convicting the operator but in elevating the moral standard of the community."

DR. OTTO H. SCHULTZE.—"I should much rather be called upon to present the subject of abortion from the point of view of one who has performed autopsies in numerous cases, than from the Coroner's side, because so far as the Coroner's side is concerned, the least said the better. I think the reader of the paper this evening is to be congratulated upon the words he used, the keynote of the whole situation is the woman. As regards the abortionist, he is out for money and will do anything for it. The worst of it is, that in terminating a woman's pregnancy in the way he does it, he often terminates her life. Though he does not do it with intent to kill, with malice aforethought and premeditation, yet it is none the less murder. I think we can throw aside all the legal verbiage, and stick to what we know is true and right. These people practise their calling secretly. They see the woman and do whatever they have to do, it is a fee and "good bye." Doctor Coe struck another keynote when he spoke of the risk the honest practitioner runs. It is the conscientious practitioner with the spirit of Christ in his heart, endeavoring to help the poor, suffering woman by stopping her hemorrhage, who is grabbed by the police; his position is very hard. The professional abortionist has laid his lines, he feels he is safe, and he is practically safe. I could recite case after case to you where the facts were evident and yet what is the trouble about getting a conviction?

The trouble lies nowhere but in the jury; and I say it without any fear of contradiction, that there is probably an abortionist among every twelve men on a jury; because not only the doctor who commits the abortion, but also the one who procures him, is an abortionist. The difficulties of proving these things, even before a court of justice with a learned judge, are very great. So then, you, sir, have struck the keynote, when you say that it lies with the woman herself. The law in regard to the proof of infanticide states that the child must be fully born,—fully born, mind you,—before infanticide can be committed. If the head is out, you can tie a string around its neck and choke it and you don't commit infanticide. You can receive it into a tub of water, before it is fully born, and you don't commit infanticide. This is perfectly ridiculous and stupid. I had occasion at one time to address a learned judge of the Supreme Court. I told him that when I spoke of life, my conception of life was, that when the spermatozoon impregnated the ovule, the ovum became an embryo and was a living thing. The mere fact of quickening does not make it anything more alive. And yet, on the point whether the child was alive when fully born and then killed or whether it was killed before it was actually fully born, hangs the decision as to whether a man is to be found guilty of infanticide or

not. Now that point has been gone into time and time again, in regard to the question of infanticide. Legally you cannot connect the crime of abortion in any way with infanticide, although, technically speaking, to my mind it is just as bad if you interfere in any way with the life and full development of the embryo or fetus as it is to do so after the child is fully delivered, since the embryo is an actual living entity. In performing an abortion you are doing something that is wrong, unless you are justified, as the doctor has pointed out, by clinical conditions that would militate against the safety of the mother. These things are well established. I think the graver question in regard to such cases lies in the fact that often someone not only does something that is wrong, but he does it badly. From the numerous cases that have come to my notice, in some the woman was not even pregnant, a curettage had been done by these people, with a result of cutting through the posterior culdesac and pulling down a loop of intestine. Now that is awful, and that is not the only caption in regard to certain things that are done by certain qualified physicians and surgeons in their operations upon women. It seems to me that it is well nigh the point of time where some one ought to institute legal punishment upon physicians and surgeons of a certain type, not only upon the abortionist, but also upon a certain kind of lax individual. And I say that from the heart, for when the heart is full the truth is told, and this is perfectly true. The point to take these people up on, is this, that they not only have done something wrong, but did it poorly, whether they started out to do an abortion or not, *something wrong*, something that they ought to be punished for, and they certainly ought not to get off, as a well-known abortionist recently did, who was caught red-handed and who delivered to the ambulance surgeon what he said was a piece of the umbilical cord, but which was really a piece of the woman's small intestine; and *he got away*. If we take up the broad sociological problem, it is a thing that I think we are hardly fully competent to approach. There are women who are honest and hard-working, who as a rule have the largest families and the least wherewith to support them; concerning these an English physician recently read a paper at the International Congress in London.

He had found a large number of cases of lead poisoning in the industrial centers of England. These poor women, not having anything else, got lead plaster from the apothecary, and it having a great reputation in their community as an abortifacient they ate it. The abortion was quite successful, but many died of lead poisoning. I know of a number of fatal cases, where it so frequently comes to light, that a physician had given a prescription for some particular disease, and someone else being troubled apparently with the same disease took the same medicine rather than have a doctor prescribe for him. You know how often bichloride of mercury is used as a douche. A few tablets are left over and they are given to somebody else, with the information that it may do them good when they are troubled with the same condition. But what do they do with them? They put these tablets in the vagina, with the idea that they will be absorbed

and kill the fetus; these women die of bichloride of mercury poisoning. There is something further back of it than mere education. These women who are hard-pressed, and have a big family to support, ought to be helped by the State. They reach a condition where it is absolutely impossible to take care of more children, they grasp at anything, go anywhere, and do anything to get rid of their threatening burden. It seems to me that on the broad proposition, that the State needs men and women in good condition, where there are women that are willing to bear children, the State should help them."

MR. A. C. VANDIVER.—"I agree entirely with Doctor Nicholson, with Doctor Coe, and with Doctor Schultze in what they have said, and I would say to Doctor Nicholson that over here in New York, not only is abortion a national failing, but it is becoming a Metropolitan characteristic. In fact, my experience indicates to me, that it is a very profitable and persistent pursuit for a great many physicians, and so much so, that they are successful professionally and financially, and are very much respected members of the community. I do not expect to tell you how we get after the abortionists over here, but I am glad to tell you how popular abortionists are with the public, and also to tell you with what measure of success we have met in punishing them. Doctor Coe was slightly in error as to the number we have been able to put in jail. In the last ten years we have managed to convict and sentence three abortionists. One of them was caught red-handed, was convicted, received six months and served them. The other two, in this County, were "framed-up." That is to say, they were well-known abortionists against whom complaint had been made from time to time, through the public prosecutor's office. Through the County Medical Society's officials, detectives arranged with these physicians to have abortions performed upon women who were pregnant. The detectives were ordered to prevent the actual abortion being committed. In one case, after several days' trial, the defendant was convicted and sentenced to a long term in prison, and in the other case there was a disagreement of the jury on the first trial, but on the second trial a conviction was finally obtained. All three of those gentlemen, however, such was their influence and experience (one of them had two former District Attorneys to represent him) were pardoned by the Governor. That is the net result of our prosecution.

Every one of these three physicians was pardoned by the Governor, without notice to the Medical Society, and in one instance without notice to the District Attorney, and with the exception of one, who is in the insane asylum, they, I believe, are still active. One of them has been fighting us as far as the Court of Appeals, to get his license back, but he has not succeeded yet. One of the members of the medical profession some years ago, vindicated abortion, to the public and to the medical profession, too. He circulated his views among the profession and to some extent among the laity as well. A few months ago he was convicted by a jury in New Jersey and he is in an insane asylum now. This goes to show that the medical pro-

fession is taking a little better view of abortion than that which prevailed before. Another abortionist had an office in the Bronx, and he arranged with a lady, who was not pregnant at all, to allow him to examine her. He agreed to perform an abortion for twenty-five dollars, and he got the money in advance too. The lady was placed upon the operating table and the police came in at that moment and he jumped out of his back window and fled. They say his card index showed several hundred patients. A great number of them were subpoenaed to the District Attorney's office, and under examination they admitted that he had performed abortions upon them. They were very much pleased with him and disliked very much to testify against him. We tried him and after three days the jury acquitted him, their view apparently being that the abortion was highly successful, that successful abortion was a good thing and they didn't want to interfere with it at all. In fact, some persons have gone so far as to indicate to us that they think there should be a professional abortionist attached to the Health Board. Now the particular matter that I was going to talk to you about was presented by me in a paper which I read to you several years ago and is in your proceedings. It related to the legal status of criminal abortion with especial reference to the duty and protection of the consultant. We have two statutes in this State on that subject. One says flatly that the physician must report death following a criminal abortion to the Coroner, and the other says that you cannot make a physician testify to facts in regard to his professional relations with a patient. I will read them both to you as they are very brief: 'When in the City of New York, any person shall die from criminal violence or by a casualty or suddenly when in apparent health or when unattended by a physician or in prison or in any suspicious or unusual manner . . . It shall be the duty of any citizen who shall become aware of the death of a person who shall have died in the manner stated, to report the death forthwith to one of the Coroners or to the clerk in attendance at the coroner's office, of such death. Any person who shall wilfully neglect or refuse to report such death to the Coroner or clerk aforesaid shall upon conviction be adjudged guilty of a misdemeanor and shall be imprisoned not exceeding one year and five months. A person duly authorized to practice physic or surgery . . . shall not be allowed to disclose any information which he acquired in attending a patient in a professional capacity and which was necessary to enable him to act in that capacity, unless, where the patient is a child under the age of sixteen, the information so acquired indicates that the patient has been the victim or subject of a crime, in which case the physician . . . may be required to testify fully in relation thereto upon any examination, trial or other proceeding in which the commission of such crime is a subject of inquiry.' Now that puts it squarely up to you. Where a woman dies of criminal abortion, under the one statute it is your duty to report it. On the other hand, if the patient does not die there is no obligation whatever upon you to report abortion. You might consider any communications with the patient as privileged. Our

Court goes so far as to say, that even if you are sent to look over a woman charged with having had an abortion performed upon her and is about to be tried for it, you may ascertain the facts from her but need not testify to them. Now under our Sanitary Code, which has the effect of law, although it consists only of regulations of the Board of Health, "the name of the physician or physicians who last, or within forty-eight hours, attended any deceased person, into whose death the coroner inquires, shall, two hours before the inquest is held, be transmitted to the Health Department." As a consequence of this regulation all the annoyance you gentlemen are subjected to, arises. In view of the increasing number of cases coming up, I should think it would be well for you to take this matter up with the present Commissioners and explain the facts and circumstances thoroughly to them. Some very reputable physicians have been down to Police Headquarters and been placed under arrest, when a death from abortion had been duly reported by a hospital, because they had been the last physician to see the patient within forty-eight hours before she died. At the same time the hospital did only its duty, in pursuance of the statute in regard to reporting deaths. In some of those cases the physician was almost indicted. This has not been due to any prejudice on the part of the police or upon the part of the public prosecutor's office, nor were there, in any way, any prejudiced methods employed on the part of the authorities; it was done simply in obedience to what is the law. It is the duty of the Coroner and the authorities to inquire into the case from the last attending physician. That is why it is frequently very important, and as a general rule almost imperative, for the physician who is called in to see a case of abortion to have a consulting physician with him, in order that the latter may testify for him, in whatever investigation might result, should the woman die. Whatever may transpire between physician and patient, when the physician is acting in his professional capacity, is privileged, as I have said, and can only be waived by the patient. Now where the patient is dead, the Courts have taken the attitude that the interests of the community are superior to the interests of the physician and the dead patient, and that the physician would have to testify to anything he knew, which would show that a crime had been committed by some person still living, who could be made to feel the effects of the law. I will read you the prevailing opinion on privilege in the case of a midwife who was convicted by the District Attorney's office for causing the death of a woman by abortion. The Court, at that time, stated when a physician might properly testify, in the following language: 'The intent of the Statute in making such information privileged is to inspire confidence between patient and physician, to enable the latter to prescribe for and advise the former most advantageously and remove from the patient's mind any fear that she may be exposed to civil or criminal prosecution or shame and disgrace by reason of any disclosure thus made.'—(McKinney vs. G. S. R. Co., 104 N. Y., 352).

As you have said, sir, the physician is not a policeman and he is

not a prosecutor, and it is not up to the physician to report what he finds out in the case of a woman upon whom an abortion has been performed, unless she dies. But it is up to him to report the death if it occurs, and in the subsequent inquiry he must testify and cannot plead his privilege. If the woman is living, he cannot be made to testify unless privilege is waived by the defendant herself. I do not think there is anything I can add to what has been said. If the physicians realize and adopt the high standard that you think they should live up to, there would not be much for me and my friends from the District Attorney's office to do. But we haven't reached the millenium yet, and abortion at the present time is not diminishing; on the contrary, in my opinion, it is on the increase."

MR. S. J. MURPHY.—"I came here entirely unprepared to address this meeting, and it comes to me as a surprise that I should be called upon after Mr. Vandiver has given to you the fruits of his greater experience in the prosecution of these cases, than I have been able to gather in my few years in the District Attorney's office. I feel, however, that I can confront this situation on an equal footing with doctors when I take into consideration the story which is told, namely, that doctors and lawyers will err sometimes, that the mistakes of the lawyers end in the Tombs, while the mistakes of the doctors end in the cemeteries. Now as regards abortions and their performance here in this city, our experience in the Homicide Bureau of the District Attorney's office teaches us that Mr. Vandiver was absolutely correct when he made the point that it is the jury which acquits the abortionist, and that Doctor Schultze is absolutely correct when he recited the case in which an ambulance surgeon was shown a section of an umbilical cord, as it was called by the doctor who performed the abortion, though in reality it was a section of the small intestine. I must tell you that the Coroner's jury in this case discharged the abortionist from custody, and that the jury was composed partially of medical men of this City. That shows, somewhat, that the practitioner is a little in favor of abortions. We find the greatest difficulty in the prosecution of men charged with this crime. I only recently assisted in the prosecution of two men both charged with manslaughter in its first degree, one for procuring the abortion and the other for performing it. The man who was alleged to have procured the abortion was tried in the first instance. He was convicted by the jury. He then turned State's evidence to testify against the doctor, and the doctor was acquitted. This is another instance Mr. Vandiver can add to his collection regarding the attitude of men composing the petit juries in this County. It is getting to be a very difficult proposition to cope with the situation, and there are many, many physicians here in New York City who are called upon constantly to perform abortions, and there are many, many patients who come to them because these operations have been successful, and so successful that they are willing and even glad to submit to a second or a third operation. The only possible ways to deal with this situation are the ways indicated by the previous speakers of the evening, along the line of the education of not only the public at large, but of the various members of the medical fraternity."

DR. BARTON C. HIRST, of Philadelphia.—“There are three divisions of the subject open to discussion as I understand it. The first may be dismissed in a sentence. In an association of gentlemen like this, there can be but one opinion as to criminal abortion, to condemn it unreservedly; but as to the other two points of view, there remains much to be said. There is the therapeutic abortion and the occasional justifiability of abortion, not on therapeutic grounds. It is to these two phases of the subject I would confine what I have to say, although the latter opens the door to one of the most fascinating and dangerous of mental exercises, casuistry. In the course of my professional career it has been frequently very difficult to decide what was the right thing to do about abortion. It seems to me there are three things to consider: the law, policy, and ethics. As to the law, I have had occasion to consult both the District Attorney in Philadelphia and the Coroner. The District Attorney told me it was my duty to report to him every case of criminal abortion with which I came in contact; this means it then would be entered upon the books of his office, which are open to the inspection of the public, that is, to the newspaper reporters. The Coroner advised me, when I saw a case of criminal abortion, to write him a personal letter stating the facts. That letter he would lock up in a private drawer to which nobody had access but himself. He further advised me to report to him again in the course of a week, telling him the probable result of the case, if the patient bade fair to recover. He would then exercise his judgment as to a public prosecution; bearing in mind the reputation of the young woman. If the case threatened to be fatal, of course the procedure would be different. This was the view of a former incumbent of the office and it struck me as sensible. In hospital practice, the situation is simpler: there is a rule that I report criminal abortions to the Chief Resident who in turn reports them to the Coroner and with that my responsibility ends. Occasionally in private practice cases present themselves that are not so easily disposed of. I remember one case, one of the first of this kind I ever came in contact with, in which it seems to me that I did right, but very foolishly, when one considers what the consequences might have been. I was consulted one night by one of my own students, who told me that he had become intimate with a young woman; that she had become pregnant by him and that he had induced an abortion upon her and he feared she was going to die. I agreed to see her with him immediately on the following conditions: that, if, in my opinion, she was going to die, I would report the facts to the Coroner, with his name, and he would have to accept arrest and probably a term in jail. If, on the contrary, the patient recovered, I exacted from him the promise that he would marry the girl. He agreed to these conditions. I went with him to the house and saw the girl, who showed symptoms of beginning peritonitis. I cleaned out the uterus which contained a decomposed ovum. As I left the house at midnight, the grandmother of the girl, with whom she lived, asked me what the matter was (it appeared subsequently that this young girl had gone to a slaughter house every month, had obtained some beef blood with

which she had stained her napkins, had put them in the wash, and thus the family suspected nothing). To save her character, I said that the girl had a tumor in the uterus which I had just removed. Fortunately the patient made a good recovery. Some two weeks later the young man came to me and asked me what he should do. He said, 'You exacted a promise from me which I am willing to fulfill, but before I do so I think it only fair to tell you that this girl is engaged to another man and to my certain knowledge has been having intercourse with a third. If you exact the fulfillment of that promise I will marry her.' But I did not.

If the girl had died, and then I had accused the young man of performing the abortion, he could have said that I did it, and his statement might have been corroborated by the girl's grandmother, to whom I lied about the character of the operation. The ethics of this case were all right, but the policy was poor. It is all very well to save a girl's reputation but we should not incur too much risk ourselves. The occasional justifiability of abortion on other grounds than therapeutics opens up a field that we might discuss not only for the remainder of this evening but for a good many more evenings to come. I am often asked to induce abortion, like every one else in my specialty. A Southern physician brought me his sister who had been raped by a negro. She was three months pregnant. He asked me to induce abortion. I refused but said, 'If I were in your place I should not hesitate to do it or to have it done, but I cannot do it.' It was not ethics but policy that restrained me. I can naturally recall a number of other cases. A young married woman asked me to perform an abortion upon her on this ground: Her husband was a busy young doctor who was engrossed in his profession. The wife was a young girl used to society and entertainment, who found her life dull and monotonous: the husband, while sympathizing with her, found himself unable to take her to the theater and other places of amusement, and suggested that she go with a young friend of his. After a visit to the theater and a late supper with wine, there was a sudden erotic impulse and a few months later the young wife found herself pregnant, but not by her husband. She told me, in an agony of mind that she could not endure the thought of seeing her husband rear and become fond of a child not his own, and was impelled sometimes in an access of hysteria to shriek out the truth. I refused to interfere, but the woman employed an abortionist and has since lived happily with her husband, apparently without remorse. Did she do right? A young physician brought a girl to me who was three months pregnant illegitimately by him. This young girl had received a cable to join her mother and father in Europe, and she was to leave on a steamer sailing the following morning. She would have to be delivered of an illegitimate child on the other side where she was compelled to remain with her parents for a year. So the physician begged me to induce an abortion. Naturally I refused. But he did it, that night, put the girl on the steamer the next morning, where she recovered from the abortion on the trip and joined her family in perfect health. Her reputation was saved

and complications of the most serious kind were avoided. Was this the best solution of the problem or not? Another class of cases occurs to my mind, those of incest. Some years ago I collected twenty-five such cases under my charge in which the father of the baby bore every possible relation to the mother, father, brother and uncle. Now there is a question in these cases whether an abortion would be the best solution. It would not be done by a reputable physician, of course, but whether such people would be justified in going to an abortionist or not is again, I think, open to debate. Other cases illustrate the difficulty of deciding on a therapeutic abortion and the different views entertained on this subject by different types of men. I was asked to induce an abortion on a doctor's wife on these grounds: In a preceding pregnancy she had become blind and insane. She had remained blind for several months after the birth of the baby and was confined in an insane asylum for some six months. She gradually recovered sight and reason and returned to her family. She became pregnant again; six weeks from the time of conception the woman's sight was practically gone and her mind was beginning to go. The doctor asked me to perform an abortion and I did it. In another case I refused to induce an abortion on these grounds: One of my old patients said, 'You remember my first confinement: that I became a raving maniac afterward?' I remembered it only too well. Then she gave me a family history of insanity among all her relatives. All the women had become insane at the menopause. She said, 'I expect fully to end my life in an insane asylum at about the time of my menopause, for all my family have done so. I am only thirty years old and I don't want to go crazy yet. Just as surely as this pregnancy goes to term, I shall lose my mind again, most likely permanently.' I was inclined to accede to the patient's request but said I could not do it without consultation. I chose as consultant one of the most straight-laced physicians in Philadelphia. After hearing the history he asked for twenty-four hours to consider. He then said, 'I cannot consent to the induction of abortion because if we do it this time, what is to prevent that woman coming to us every three or four months and saying, 'Please relieve me of the difficulty once more.' That ended the matter as far as I was concerned, but the husband of the patient put her in the hands of an abortionist. Was he right or wrong? It is these cases just cited which inspire a feeling of leniency in the general public toward the induction of abortion, but again it is not necessary to repeat that in an association of gentlemen like this, there should be no difficulty on the part of individual members in deciding what their course should be. If under the law, an abortion must be regarded as unjustifiable, a reputable physician must have nothing to do with it, no matter what the excuse might be."

DR. R. C. NORRIS.—"I did not expect to speak on this subject. We all have had experiences analogous to those of Dr. Hirst. As far as I see the situation, criminal abortion is a long existing social evil which began in man and in woman long ago and which we cannot now control by legislation or by education. The Church even

has failed to control it. We must approach the question of criminal abortion with a high standard for the medical profession, realizing that it is a situation akin to the social evil. We will meet it perhaps more and more among individuals and communities where a life of luxury is dominant. We cannot settle the problem, and I venture the prophecy that perhaps a century from now this same question may be brought before some future society and discussed very much as it is to-night. It is a hopeless situation as I see it to-day and there is but one thing for the medical profession to do as far as criminal abortion is concerned, and that is for it to exercise its privileges and its prerogatives with a high sense of honor and moral tone, always working in conjunction with the educational propaganda against criminal abortions. I trust that future generations may be able to meet the situation with more control over the criminal sexual instincts of human nature. As to the therapeutic point of view, I believe that a change in our standards may come with the lapse of years. Who has a right to say that a patient's moral reputation is not as valuable to the community as is the physical condition of some of those who apply to have so-called therapeutic abortion induced upon them. Are we of the profession the only ones who are to make that decision? I am sure if I were a woman illegitimately pregnant that I should think quite as much of my reputation as I would of a threatened attack of tuberculosis or a trifling heart lesion both of which some physicians unhesitatingly class among the indications for therapeutic abortion. These are questions of the greatest importance to us. We cannot rely entirely upon 'obstetric indications' and in an arbitrary way reach definite conclusions along fixed lines and say 'so far shalt thou go and no further.' As the attitude of our profession changes, the therapeutic point of view will widen, I believe, as the years go by. We will come to look upon the termination of pregnancy, not solely to save one's life, but there will arise situations where greater experience will teach the honest physician that it is justifiable to terminate pregnancy for some causes which we do not tolerate to-day. It is a question therefore, I think, of advanced and advancing knowledge; what we cannot avail ourselves of to-day may be the standard to-morrow. As we look at it in its broadest sense, we revert to our original proposition, that criminal abortion and the social evil are 'twin brothers' and the same efforts to control the situation in one way will help to control it in the other."

DR. H. D. FURNISS.—"May I ask the legal talent present for some information? Some years ago I had a patient who desired that I perform an abortion upon her for economic reasons, because she had three children, I positively refused to do it. The next I heard of it was when her sister-in-law called upon me and said, 'Have you heard about Tom's wife?' I said, 'No, what has happened?' 'Why,' she said, 'She died of peritonitis in Roosevelt Hospital.' A few days after that I was called up by a man who wished to make an appointment but would not give his name, he called up again three successive times to make an appointment but wouldn't give his name, and

finally a man came and told me that he was from the District Attorney's office and wanted to investigate the death of this woman, saying that she had died as the result of an abortion. In her antemortem statement she said that I had induced that abortion. From her family they finally found out that she had gone to another doctor who had induced the abortion, from which she died. Now as I understand it, since this patient died it would have been all right for me to disclose my relations with her, for my own protection. But suppose this woman had not died after having made this statement, would I have had a right to disclose my relations with her in my own defense? Would her information have been so privileged that I could not have used it in my own defense?"

MR. VANDIVER.—"No, you would not have been permitted to tell anything of what had happened. The patient was dead and could not waive privilege. You mean had she lived and charged you with criminal abortion?"

DR. FURNISS.—"She had made an antemortem statement, believing that she was going to die. Now had she lived could I have defended myself?"

MR. VANDIVER.—"You could, but it would have been better to keep your own lips closed where your own liberty is at stake. That has been decided in some cases."

DR. FLORIAN KRUG.—"Let me state an experience of my own when I was foreman of a Coroner's Jury. The testimony was taken at great length and it was absolutely convincing. The lover of a girl who was willing to marry her as soon as his financial condition would permit, had had intercourse with her. When she was three months pregnant he provided her with the money to go to a midwife who performed an abortion and she died of sepsis. When the jury had retired to the deliberating room, I thought the case was as plain as daylight and there wasn't anything else to do but to take a vote on the matter, and I expected that we should find the lover as well as the midwife guilty as charged. However, one juror began, 'Well, I don't know, of course the poor girl is dead now and no one can revive her, but I think if I should have been in his place I would have done the same thing.' Well, I could not get more than four besides myself to hold the midwife and the lover, the other seven voted to dismiss the case. I argued with them for a long time, but they stoutly maintained that while it was very unfortunate for the girl, they didn't think they were justified in holding the defendants, and held 'They didn't believe in punishing anyone for a thing like this.' But now to something more serious. I have listened to what some of the previous speakers have said about a higher education of the woman, and about the influence of the church to reduce the number of abortions. Doctor Norris has told us that probably 100 years from now we would still be on the same basis, discussing the problem in the same way. I have hopes that things will turn out considerably different and that we will be able to prevent or at least reduce the crime of abortion by being allowed to show the people the way of preventing conception. The sexual in-

stinct is one of the strongest, and perhaps the strongest instinct as it is meant for the propagation of the human race, and it is very hard to fight against it. A great many of our young working girls and boys find it difficult to marry, to produce children and take care of them under present social conditions with the high cost of living. Still that instinct is there, and intercourse will take place, and if they are both healthy conception will follow. I firmly believe that to limit abortion, we must limit conception. We will never weed abortion out entirely, but the greatest hope lies in the prevention of conception. Now here is where I wanted to ask our learned counsel a question. I was told on very good authority that a Federal statute made it a criminal offense to advise or furnish a patient with means to prevent conception, and that this crime was punishable with five years at hard labor and \$5000 fine besides. I was also told that a physician who had been convicted on two such counts, was serving a ten years' sentence at hard labor at Atlanta. I was furthermore informed that when his own community sent a strong petition for clemency to former President Roosevelt asking for a pardon, the answer came, that he was sorry that the doctor had to serve only ten years, because if he could have pronounced the sentence he would have to stay in Atlanta for twenty years. Now I hope Mr. Vandiver will explain to us the proper meaning of the law."

MR. VANDIVER.—"The Federal statute is in relation to the use of the United States mails as a means of distributing either literature or medicines to be used for the prevention of conception. The Federal Constitution has left to the individual States the matter of punishing crimes of this kind; they are police matters, and it is a fact that in this State there is a statute which provides that any person who advises a woman to perform an abortion upon herself, or to employ somebody else to do it, is guilty of a felony."

DR. KRUG.—"That is not the question. I spoke of giving advice or furnishing means for the *prevention* of conception."

MR. VANDIVER.—"That makes no difference in New York, it is criminal under our statutes."

DR. KRUG.—"I think preventing conception is the only way of solving this problem of criminal abortions, and at the same time to allow people to satisfy their sexual instincts. These are very strong instincts which not everybody can overcome and which some will satisfy in spite of all the Church influence, or the higher education. If you deny them this solution of the problem, I see no other way to prevent criminal abortions."

ANOTHER DOCTOR.—"I should like to ask a question, and that is whether there is anything in this statute, or any other statute which prevents anyone from giving advice to a woman to submit to sterilization for the purpose of avoiding pregnancy."

MR. VANDIVER.—"I will read the statute: 'Abortion in this State is defined as follows: A person who with intent thereby to produce miscarriage on a woman, unless the same is induced to preserve the life of the woman or of the child with which she is pregnant, either

prescribes, supplies or administers to a woman whether pregnant or not, or advises or causes a woman to take any medicine, drug or fill in or uses or causes to be used any instrument or other means, is guilty of abortion.' Now if she is not pregnant and you advise her to have her ovaries removed, I don't think that would be criminal."

"What I have to say farther is more or less a message from New York to Philadelphia. Doctor Nicholson, we have provided in New York, that an individual who sells to a person any substance for the purpose of preventing conception commits a misdemeanor. And we provide further that the commission of an abortion is a felony punishable by a severer penalty. We have not been very successful in prosecuting abortion cases in which registered physicians are defendants, but in the cases in which persons other than registered physicians are defendants (I refer to midwives who perform abortions, or attempt to perform abortions), we have been very successful in having them convicted for the misdemeanor of practising medicine without a license. These cases are tried before three judges without a jury, and invariably we obtain convictions and have them sentenced to such an extent that we have greatly minimized, I think, the practice of abortion among unlicensed persons. It has at least saved the lives of many people who are usually their victims, and I recommend this means to you, to take up with the legal authorities of Philadelphia, to minimize abortion."

DR. NICHOLSON (closing).—"I have but little to add to what I have already said. The discussion has wandered somewhat from the consideration of the actualities which confront us. Casuistry is of little value here. We know that this crime is on the increase, we know that skilled abortionists are at work in all large communities, scientifically we are agreed that an abortion destroys fetal life. The question is not, as some of the speakers have contended, as to whether in rare instances we might be tempted to advise the performance of the operation to save the character of an innocent woman. As I stated in my paper there is no need to concern ourselves with this phase of the matter since there is no danger but that there will be ample opportunity afforded for the relief of all such cases. If this crime is to be checked it must be done by the education of the women of tomorrow in the fundamental biological principles."

TRANSACTIONS OF THE OBSTETRICAL SOCIETY OF PHILADELPHIA

Meeting of April 2, 1914.

The President, GEORGE ERETY SHOEMAKER, M. D., in the Chair.

CYSTIC SARCOMA.

DR. OUTERBRIDGE.—In connection with the case reported by Dr. Laws, I thought it might be of interest to present a somewhat similar specimen which was removed by Dr. Frazier two or three years ago. The patient from whom it was taken was a girl nineteen years of age, suffering from a large abdominal mass, the character of which was not diagnosed before operation. Upon opening the abdomen a large cystic mass the size of an adult head was found. It had developed between the layers of the broad ligament, and was adherent to the intestines, which were somewhat injured in getting it out. Microscopically the tumor shows in practically all parts spindle-cell sarcoma, somewhat of the fibrosarcoma type, and in places suggests the structure of ovarian stroma. Cystic tumors of this type are exceedingly rare; the point of origin in this case is somewhat obscure, especially as the resident's history, upon which I am dependent for the clinical data, states that the corresponding ovary was preserved. It seems highly probable, however, that the sarcomatous tumor arose from a portion—possibly aberrant—of ovarian tissue; the cystic condition was evidently the result of secondary degeneration.

DR. GEORGE M. LAWS reported a case of

CYSTIC FIBROSARCOMA OF THE OVARY AND BROAD LIGAMENT RESEMBLING PREGNANCY.

The patient, Mrs. Z., aged fifty years, a multipara, was admitted to Dr. Shoemaker's service at the Presbyterian Hospital, October, 1913, and operated upon by him. She presented an abdominal tumor as large as that of an eight months' pregnancy which was cystic in some portions, hard in others with elongated masses movable in fluid. There was a curious kick to be felt over the tumor which the patient stated could sometimes be seen through the clothing. This was evidently due to spasmodic contractions of the psoas muscle, as it was transmitted to the thigh.

Diagnosis by physical examination was difficult on account of obesity and because at a previous operation for prolapse of the vagina

the canal had been so nearly obliterated that no data as to the condition of the lower portion of the uterus could be obtained. I had examined her nine months previously and found a small tumor at that time. To entirely exclude pregnancy, an x-ray examination was made which was negative. The Wassermann reaction was negative, blood showed 60 per cent. hemoglobin, leukocytes 6750 R. B. C. 4,660,000. The specimen explained the sensation of hard parts of the tumor movable inside of fluid. It showed a large quantity of thin fluid contained in thin-walled sac-like cavities upon the surface of the tumor. The fluid was nearly black in color from degenerated blood. The pedicle was the size of only two fingers. It sprang from the left infundibulopelvic ligament and was entirely distinct from the ovary which was normal in size and position. The pedicle was ligated and both tubes and ovaries were also removed. The patient made an excellent recovery. Pathological report: The main tumor is a cystic fibrosarcoma. A small fibrosarcomatous nodule is present in the left ovary. There is chronic interstitial salpingitis and ovaritis on both sides.

DR. JOHN G. CLARK read a paper on

THE ACTION OF THE GONOCOCCUS ON THE ENDOMETRIUM*

DISCUSSION

DR. F. H. MAIER.—I have listened with a great deal of interest to Dr. Clark's reference to an area of mucosa in the uterine cornua inaccessible to the curet and therefore always a possible source of general infection. I believe that when the infection has invaded this portion of the uterus the tubes are also involved, and a complete cure by means of local therapy is impossible. Nor is this result to be obtained by the removal of the adnexa alone, assuming, of course, that the symptoms and pathology justify abdominal section, even when accompanied by a resection of the mural portion of the tube. I believe the only method of permanently eradicating gonorrhea from the genital tract is by the removal of the uterus, tubes, and ovaries, and then subsequently supplementing the operative procedure by a vigorous local therapy for the purpose of destroying the cocci in the mucous membrane of the urethra (Skenes ducts), the vulva (Bartholin's ducts), and the vagina.

There is a class of patients, however, who possess a milder type of symptoms, or who desire to retain their procreative organs, in which it is not only undesirable but even prohibitive to resort to so radical a method of treatment. These individuals are undoubtedly benefited by the local means suggested by Dr. Clark. I have not infrequently brought about a cessation of the symptoms, and in a percentage of the cases pregnancy has occurred, by a persistent course of treatment, at intervals, extending over certain months and years. In some of these women the pathology of the tubes and ovaries was of a character to make sterility an apparent certainty. In the treat-

* (For original article see page 96)

ment of the uterine infection I confess that the much vaunted silver preparations have never proved as efficacious as direct applications of iodine and formalin, the latter in its ordinary commercial strength.

To speak of a permanent cure in these cases, however, is impossible; the symptoms may be reduced to a minimum, and pregnancy may even intervene, but sooner or later there is a lighting up of the infection in varying degrees of intensity.

DR. CHARLES C. NORRIS.—I regret extremely that I was delayed and thus prevented from hearing all of Dr. Clark's paper. I believe it is true that in the past we have overestimated the danger of entering the uterine cavity. With proper technic and in properly selected cases this can be performed with comparative safety.

The treatment of endometritis of gonococcal origin is extremely important. The first consideration is undoubtedly a correct diagnosis. Especial care must be exercised not to mistake a cervicitis for an endometritis. If this error is made, attempts at intrauterine treatment may easily result in spreading the infection upward. Presuming that an endometritis is present, caution must be observed not to overlook an extension to the tubes. If a salpingitis has already developed, intrauterine treatments are of little avail as the endometrium is being more or less constantly reinfecting by leakage from the infected tube, indeed under such circumstances unless the treatment is carried out with great care it may be actually detrimental and may cause a sharp exacerbation of the pelvic inflammatory disease.

In addition to a correct diagnosis, judgment should be exercised in the selection of cases. One or two treatments are of little value. It is, in my opinion, hardly worth while attempting intrauterine treatments except in patients who will conscientiously cooperate with the physician by regular attendance and proper living. It is obviously impossible to hope for any results from this type of treatment in patients who are cohabiting with an infected husband. It is also of the utmost importance that treatment be directed to the cervix, urethra, and Bartholin's gland, these areas, especially the two former, being nearly always contaminated.

It will be seen that the number of cases in which intrauterine treatment is applicable is somewhat restricted. Given, however, a case of gonococcal endometritis, every effort should be made to cure the condition before extension to the tubes takes place.

Another class of cases in which this treatment is strongly indicated is in patients upon whom conservative operations have been performed. We are, I believe, too prone, after the removal of a tube and a curettage of the uterus, or other similar type of operation, to dismiss the patient as cured and to overlook the fact that a latent gonorrhea is in all probability present in the cervix or lower genital tract and that infection from these areas to a hitherto normal tube or ovary, may occur. When possible, such patients should be safeguarded from exogenous infection and given a thorough course of postoperative local treatment.

Pontoppidan has recently published some interesting studies bear-

ing upon the question of intrauterine treatments. In a series of 157 women suffering from gonococcal endometritis and treated by intra-uterine applications, 17.2 per cent. developed adnexal lesions whereas in a second series of 156 similar cases in which no treatment was directed toward the uterine mucosa the infection spread to the tubes in 19.18 per cent. of cases.

DR. JOHN M. FISHER.—I think the subject of diagnosis is a very important one. Chronic gonorrhea appears to be very difficult to diagnose. I asked a bacteriologist of large experience whether he could make a diagnosis of gonorrhea in the female from a smear. He said, yes, in an acute case, but not positively in a chronic case. The micrococcus catarrhalis and the gonococcus resemble each other so closely that it takes an expert to differentiate them. I think it important to emphasize the fact that to make a positive diagnosis of gonorrhea in the female is not a very easy matter. Dr. Clark refers to a more active treatment of these cases than formerly. I have for years not hesitated to treat these cases very actively. My treatment carried out at the Philadelphia Hospital is to give the patient an anesthetic and have the vagina thoroughly scrubbed with soap and water. A cylindrical speculum is now introduced and a solution of 40 grains to the ounce of nitrate of silver is poured into it thus exposing the cervix to its penetrating influence for two or three minutes. Preceding this the plug of mucus is removed from the cervical canal. A forceps armed with cotton is next introduced through the speculum and the speculum drawn over the forceps so that the silver solution is brought in contact with every portion of the mucous membrane of the vagina. The silver solution, likewise is applied to the external parts of the vagina and vulva. To neutralize the excess of the silver solution the speculum is reintroduced and normal salt solution poured into the vagina. This is swabbed out and then a tampon of lamb's wool of sufficient size to distend the vagina covered with ichthyol 25 per cent. and lanolin 75 per cent., is introduced and allowed to remain for two days. When it is removed there is adherent to it a coagulated mucoid cast, leaving a pale pink mucous membrane behind. I had a case at the Jefferson Hospital last year of a young woman with acute gonorrheal infection treated in this way who left the hospital without any discharge within four days. Only one application was made and I saw this young woman six months later when there was no evidence of extension to the appendages. I had a like experience in a more aggravated case recently. In both of the cases the diagnosis was confirmed by bacteriological examination. In all chronic cases whatever the cause of the discharge from the vagina and cervix may be, gonorrheal or otherwise, I never hesitate to make this same application. I have never seen any harm result from it. I can say, therefore, that in cases of gonorrhea of acute or chronic type I feel that this is the proper treatment.

Dr. Clark spoke of the infection of the endometrium and of the cervix. The gonococcus appears to have a special predilection for the racemose glands of the vulva and cervix. By using the cautery I can understand how the gonococcus can be destroyed in the deeper

structures, but how can it be ascertained that the infection is limited to the cervix so that this treatment alone would cure a case? Furthermore, in cases of this kind especially in women who have not borne children in whom the os is no larger than it should be there is danger by cauterization of bringing about a cicatricial contraction of the canal. I should certainly hesitate to make these cauterizations in the case of a woman who had not borne children or one who wasn't the possessor of a very patulous open cervical canal.

DR. STRICKER COLES.—I have obtained the best results with free use of Churchill's tincture of iodine, which should be applied to cervical canal and vagina, the excess removed and then boroglycerid on lamb's wool tampon. This treatment used every second or third day. Most of my cases have been pregnant women and if treated for four or five weeks there has never been any infection of child's eyes or of the mother.

DR. JOHN A. MCGLINN.—I see very few cases of actue gonorrhea. I have employed the yeast treatment recorded in literature with disappearance of discharge and of the microorganisms. The treatment is not severe. The yeast in the form of a paste is applied on a tampon so that all the vaginal mucous membrane and of the cervix is covered. There is no severe pain as with the use of the nitrate of silver. Diagnosis in chronic cases is very difficult. In spite of repeated examination of the discharge evidence of the microorganisms is not disclosed. In treating a case of gonorrheal infection of the uterus I feel that it is very difficult to say whether the disease is limited to the cervical mucous membrane or extends to the uterus. I am a little loath at the present time to give up the idea that it is dangerous to enter the uterine cavity unless the patient is anesthetized. There is a possibility of great danger in entering the uterus with instruments, no matter how sterile because it is impossible to sterilize the vagina without an anesthetic. Under the present methods of anesthesia the uterine cavity can be entered very carefully and curetted or treated with the application of iodine or silver salts to the mucous membrane. While this can without doubt be done in a well-equipped hospital the method is dangerous so far as sepsis is concerned in the hands of the average practitioner.

DR. EDWARD A. SCHUMANN.—Dr. McGlinn's reference to the yeast treatment has prompted me to speak. I run a clinic in my office in connection with several mission societies in the Tenderloin. In the last three years I have had about 120 cases of acute gonorrhea. The gonorrhea was noticed by these women within thirty-six hours of the time I have seen them. I had seen very good results from Dr. Fisher's vigorous treatment of this condition, but in these cases it was impossible to employ it. The women would not take an anesthetic and the method was too painful for office treatment. I tried the various iodine and silver salts without success, until I, too, heard about the use of yeast with the result that in the last seventy-five cases, sixty-two showed entire absence of bacteria in the vaginal discharge or by examination within two weeks. The yeast is in the form of a brown granular powder which is poured into the vagina

through a speculum every alternate day for a week. In my hands this has been the one method resulting in the cure of acute gonorrhea.

DR. CLARK, closing.—In response to the discussion which has been offered relative to the suggestions embodied in my paper, I would say that some of the speakers have confined themselves to a consideration of acute gonorrheal attacks rather than to the chronic stage. My suggestions as to treatment have nothing whatever to do with the acute stage and it is therefore not necessary for me to take up this side of the discussion. Gonorrhea of the cervix or endometrium when it once becomes a chronic process tends as we all know to pass through the various stages of acute exacerbations and periods of latency but sooner or later spreads to the Fallopian tubes when some form of radical operation is necessary. Unfortunately, conservative operative treatment in this final stage does not give very satisfactory results. As I have stated, it is only the occasional case of gonorrheal endometritis that can be relieved by any form of local treatment because there is usually a continuous source of reinfection. Certainly, unless this side of the question can be controlled it is quite useless to consider any form of treatment with a view to cure. There are, however, cases which are constantly coming to us where there is a possibility of controlling all of the factors in the case in such a way that if the endometrium may be relieved, there is a possibility of ultimate cure. A simple curettage is of value only from the diagnostic standpoint. Bactericidal means must be employed if the gonococci are to be destroyed. The question has been raised as to the dangers of local application. If it is done carelessly, then it carries the greatest hazard and cannot under any conditions be recommended. I do not agree with one of the speakers who insists that the cervix cannot be prepared properly in an office for intrauterine medication. If the external os can be exposed as is possible with a trivalve speculum and the use of a good spot lamp, there is no reason why one cannot thoroughly cleanse the cervix as well as in the operating room.

As to the danger of cicatrization of the cervix which may follow the method of cauterization as suggested by Dr. Hunter, I would say that in my own experience there has not been the slightest tendency to this. The spoke-like cautery incisions in the cervix do not pass deeply enough into the cervical mucosa to cause this trouble. The object of the cautery is to partially destroy the racemose glands of the vaginal portion of the cervix, which may be the seat of infection.

As to the question of local treatment of a vaginal discharge by means of yeast, I am sure it must be of value because our European colleagues have reported most satisfactory results. In dispensary and even in office practice the plan which Dr. Schumann is pursuing must therefore be of value.

The suggestions which I have given in my paper apply only to a limited number of cases and these cases should be under the care of men especially prepared to deal with them. It is not a treatment which can be successfully carried out by the general practitioner nor is it applicable to those in which reinfection is likely to occur.

In such cases, palliative treatment is all that can be done. My remarks particularly apply to the innocent class where sterility is almost certain to occur if the gonococcal endometritis is not cured. In the diagnosis, two factors are essential—first, the history of an acute attack; second, the persistence of a chronic mucopurulent discharge with slight reddening of the external os uteri. With these conditions before us, I believe it is possible after curettage to effect a complete cure with properly selected intrauterine applications. It is this follow-up method that is essential. In the past we have usually been content to perform a curettage with the application of iodine or formalin and then lose sight of the patient completely. Such treatment to my way of thinking is worse than useless and may stir up rather than relieve the condition. Dr. Charles Norris has therefore reached a vital point in this discussion when he lays stress upon the necessity for the careful postoperative treatment of these cases. After all, this is the serious discrepancy in our work—we know too little of the ultimate results in our cases. Dr. Codman of Boston has inaugurated a splendid propaganda in insisting upon the necessity for the final account of cases in arriving at conclusions as to the value of surgical or medical treatment.

The suggestions which I have offered are not for general practitioners but for men in special societies such as this. To specialists must be referred the task of pioneer work, which, if successful, may be passed on to the general practitioner.

DR. GEORGE ERETY SHOEMAKER reported

A CALCAREOUS SHELL IN THE EXTERNAL ILIAC VEIN TWENTY YEARS
AFTER PUERPERAL PHLEBITIS.*

Also a case of

TUBERCULAR PERITONITIS AND SALPINGITIS, CURED.

Admitted to the Presbyterian Hospital, April 4, 1909 (five years ago) on recommendation of Dr. Samuel W. Morton. She was twenty-four years old and single. Previous medical history included an obscure typhoid attack, eight months before, since which, menstrual periods, previously normal, had been more profuse, closer together and painful. They were of two to three weeks, interval, six to eleven days' duration. Leucorrhea between.

It is probable that the attack was in the nature of tubercular salpingitis and peritonitis, instead of typhoid.

Constant general abdominal pain and soreness present on admission.

Examination.—Showed obscure diffuse abdominal indurations. The hemoglobin was 70, leukocytes 9200, red cell 54,030,000, the temperature about 100; the pulse elevated, appetite poor, bowels constipated.

Exploratory Laparotomy, April 7, 1909.—Median incision, no free fluid. General adhesions. Parietal peritoneum thick. Tubercular

* See original article, page 1013.

nodules, pea size to bean size, studded thickly the parietal and visceral peritoneum, together with all the abdominal and pelvic viscera. On the intestines these nodules were more abundant near the mesenteric attachment. They were very abundant in the mesentery, closer together as the root was approached, so that posteriorly there was almost a continuous infiltration. All coils were adherent. There was no open peritoneal cavity. The adhesions were vascular gray webs, easily broken until a nodule was nearly approached, when the structures were inseparably joined. The nodules were amyloid in appearance and frangible. Two were removed for laboratory examination and later pronounced tubercular.

There was no drainage, and no chance of removal of diseased organs appeared. The abdomen was closed with little hope that permanent good would follow, as the dry cases with general involvement are seldom benefited by operation.

She returned to the care of her physician and several months afterward had an attack of pleurisy, also supposed to be tubercular.

She presents herself five years later, having gained 56 pounds in weight and enjoying very good health. The present weight is 146, and as all may see she looks extremely well.

There is no cough. There are no other complaints except of moderate constipation. Yesterday, examination failed to detect any abdominal masses, or other indications of disease. She is single and menstruation is regular and but moderately painful for the first three of the five days. She works regularly as a clerk.

The tuberculosis is therefore cured. Just why or how such a result should follow a simple laparotomy, with some manipulation of adhesions, no one at present knows.

DISCUSSION.

DR. E. F. BAER.—Of the cases of tubercular peritonitis that I have operated upon I will relate briefly two, because they emphasize some of the points brought out by Dr. Shoemaker.

The first case, brought by Dr. DeLong of Emporium, Pa., in 1889, was at first thought to be a large ovarian cystoma. Even at that early day large ovarian tumors were becoming rather uncommon and some medical friends had asked me to invite them when another turned up. Among the guests, the late Dr. Thos. M. Drysdale was the most prominent. As you may remember, Dr. Drysdale was the son-in-law and assistant of the late Dr. Washington L. Atlee, the pioneer. After the patient had been anesthetized, the projecting abdomen flattened a little, and gave a rather resonant sound on percussion. Fortunately, I said before making the incision, that I did not believe we would find encysted fluid, for such proved to be the case. Instead, free fluid appeared, and many quarts were evacuated. Then a condition which almost baffles description presented itself. The peritoneal surfaces everywhere, abdominal wall, intestine, omentum, mesentery and pelvis were so covered and studded with tubercles as to be almost unbelievable. The ovaries and tubes were

enlarged and seemed to be more affected than the other organs. After irrigating thoroughly with warm sterile water—it was before we began using saline—I removed the uterine appendages, because it was thought that the infection might have come through the tubes. A rubber drainage tube was placed. Recovery was rapid.

I saw this patient again in 1893—four years after the operation. She was and had been in excellent health. Five years later, 1898, she went home to Sweden, and I continued occasionally to hear, through Dr. DeLong, and once direct from the patient herself, up to within a few years ago, that she remained in good health; the last time I heard from her was twenty years after the operation.

The other case was sent to me through Dr. James K. Young, by her physician, of Trenton, N. J. I think her age was only about fifteen years. The abdomen was round and seemed to contain a solid tumor. Incision revealed a dry peritoneal cavity and a solid mass, but not any sign of momentum or intestine. Further investigation showed that the condition was one of tubercular lymph exudation, shutting out all view of the abdominal organs. Nothing was done except irrigation, this time with normal saline, and the incision closed. I felt sure that death of this patient would result from the operation. But she went home within three weeks, apparently improved. Probably five years later, I was greatly surprised, to receive a letter from her, telling of her marriage a year before. She wished to learn whether I had removed organs that would result in sterility, because she had not become pregnant. She said she had continued well after recovery from the operation. As the reader has said, it seems a marvel that these patients recover and remain well.

DR. JOHN G. CLARK.—I was especially interested in Dr. Shoemaker's record of the case of calcification of the iliac vessel. The question naturally arises, what has taken place in the reestablishment of the circulation? I recall a very interesting case which Dr. Joseph Price reported before this Society in which there had been complete occlusion of the common iliac vessel following an operation for a large appendiceal abscess. The collateral circulation, however, had been gradually established through the epigastric and inferior mammary vessels. There were enormous varicosities upon the anterior abdominal wall marking the path of the extramural circulation. The patient was apparently in perfect health.

DR. JOHN M. FISHER.—In connection with the matter of calcareous deposits, I have a specimen here removed from a patient about ten years ago. She had been operated upon about five years previously at the Jefferson Hospital. The patient was thirty years of age and had disease on the right side of the pelvis. At the time of admission there was a mass on the opposite side. Upon making an incision through the abdominal wall I encountered a rigid substance and dissected out this calcareous plate along the line of the previous incision in the abdominal wall. It is about an inch wide and 3 inches long.

DR. JOHN A. MCGLINN.—I think the opinion is generally held,

as expressed in the literature that the mere opening of the abdomen does not do much good in the adhesive type of tubercular peritonitis. No satisfactory explanation has been offered for this. In tubercular peritonitis of uterine origin, better results are obtained by removal of the pelvic organs. Eight years ago in operating upon a case of adhesive tubercular peritonitis I felt that on account of the denseness of adhesions that the plan of introducing oxygen into the abdominal cavity would be of benefit. This was carried out with success. I have tried the inflation of the abdomen with oxygen in both cystic and adhesive peritonitis and reported, six years ago, seventeen cases which were followed for a while in which there was apparently cure after a period of a year or two. Since the appearance of that paper other cases have been reported not only of tubercular peritonitis but of other forms of peritonitis. The thing that always annoyed me was that although I advanced the idea of using oxygen in this way my paper received no recognition while others were quoted.

DR. GEORGE M. BOYD.—I have had some experience with this variety of tubercular infection in two desperate cases. One was operated upon three or four years ago with removal of the appendages so far as possible. There was fecal fistula subsequent to injury of the bowel. The patient finally recovered from the abdominal operation but developed a recurrence of an old chest lesion and died. The second case was operated upon about a year ago. There was an extensive adhesion in the lower abdominal cavity and an abscess on the left side. The tubes and ovaries were removed as well as possible, although it was an imperfect dissection. The abscess was drained, a fecal fistula following and remaining open for a month or more, finally closing. As soon as the fecal fistula closed the patient began putting on fat and her present condition is remarkable. She seems to be in perfect health.

DR. STEPHEN E. TRACY.—I have had a number of cases of abdominal tuberculosis and with one exception, a tuberculosis of the vermiform appendix, the pelvic organs were involved in every case. In some cases there was considerable fluid, in the majority there was not. In all cases adhesions were numerous. In some of the cases an hysterectomy was done; in the majority, however, the Fallopian tubes only were removed. As far as I know all of these patients have had a satisfactory result. One patient on whom I did an hysterectomy about fourteen years ago, is enjoying good health. Another patient remains in good condition ten years after an hysterectomy. The other patients I do not know much about, as they have not been followed up except for a few months after operation. When last heard from they were all in good condition. While I dread to drain a peritoneal cavity which contains a tuberculous infection, infiltrated and injured bowel made it necessary in some of these cases.

This winter we have used oxygen in tuberculous wounds and have been surprised how quickly they have healed. This was especially true in one wound which broke down about four weeks after operation; the wound being entirely healed again at the end of two weeks.

In answer to Dr. Shoemaker's question, I will state that no attempt

was made to recover the tubercle bacillus from the wound, as it was taken for granted that the infection was tuberculous, as the intraperitoneal infection was of that character.

DR. SHOEMAKER (answering Dr. Clark).—The calcification was situated just about half way between the side of the uterus and the internal border of the ring. It was under the plane of the ureter. There was no obstruction to the iliac vein at this time. It had originally been obstructed, at least in part, if one may judge from the history of disability, swelling, and varicosities in the whole extremity, from the persistenc of some of these calcified mass in the location noted. The vessel was traced out from the ring, and was clearly the external iliac. There were no decided varicosities along the anterior parietal vessels.

DR. NORMAN S. KNIPE demonstrated

THE METRASCOPE.

The idea of improvising some instrument for the examination under direct vision, of the interior of the uterus, is not new.

Several years ago with an ordinary proctoscope and a small reflected electric light on the end of a wire, I endeavored to determine at what point within the tube it was necessary to place the light, in order to obtain the best reflection of light on the field of vision. I found of course that the nearer the light to the end of the tube, the better the illumination.

The following points are essential.

1. There must be a direct reflection of electric light on the field of vision. Mirrors have no place in instrumental intrauterine examination.
2. This light must be so placed as not to be interfered with, by bloody discharge, etc.
3. The tube of the metrascope must be made as small as possible so as to obviate too great a dilatation of the cervix.

The metrascope consists of a straight tube, 10 inches long, of 36 (French) caliber. On the under side of the tube, about 3 inches from the ocular end is an opening and outlet pipe for drainage. Directly opposite the outlet a small but powerful electric light is so placed as to be well protected from any discharge that may be present and yet to give a brilliant reflection within and at the end of the tube. Provision is also made for flushing out the uterus through the metrascope. The instrument has been given a thorough trial and is of inestimable help in intrauterine diagnosis, if properly used.

TRANSACTIONS OF THE NEW YORK ACADEMY OF MEDICINE.

SECTION ON OBSTETRICS AND GYNECOLOGY.

Stated Meeting, held March 24, 1914.

DR. ASA B. DAVIS *in the Chair.*

BROKEN GLASS CATHETER REMOVED FROM THE BLADDER.

DR. FORBES HAWKES reported this case. The patient had been catheterized and, on withdrawing the catheter, it broke and a piece was left in the urethra. The house surgeon attempted to grasp it but he broke in into one or two pieces. A No. 12 Kelly's speculum was then passed and the remains of the catheter came into sight, lying transversely in the bladder. The forceps were introduced, the catheter grasped and removed. There was no bleeding at all and the patient had done well since.

CARCINOMA OF THE KIDNEY ASSOCIATED WITH CALCULI.

DR. FORBES HAWKES presented this specimen which he removed from a woman, twenty-nine years of age. She gave birth to twins eight years ago and had convulsions six or seven days after, a typical epileptic seizure. It was supposed to be syphilitic in origin. She had no convulsions last year. There were no urinary symptoms whatever. Her hands and feet were cold. On the right side was a large tumor, and the history she gave was that of tumor of the liver. Because of the syphilitic history this tumor was supposed to be a gumma. The Wassermann reaction was negative. The x-ray showed the presence of a stone in the right kidney. The patient was in no condition for a nephrectomy. The urine was clear, specific gravity 1008, no pus cells and no casts. At operation the kidney was found to have one large sac, cystic, and with hardened material within. The patient did fairly well for eight or twelve days and then died of exhaustion. The liver was found to be studded with hard nodules. The kidneys were of the hydronephrotic type.

CARCINOMA OF THE RECTUM.

DR. FORBES HAWKES presented this case. The woman was fifty-seven years old and had had one child. She had never been constipated. She occasionally had sick headaches. There was no history of tuberculosis and no syphilitic history was obtainable. Her husband had tuberculosis. Two years ago she had some rectal pain, rectal distress, and passed some blood. On examination an

annular flat growth involving the rectovaginal septum was discovered. As a preliminary step an artificial anus was made and then the growth removed later. He also removed the coccyx and a portion of the sacrum. An uneventful recovery followed and the artificial anus was now closed.

DR. JOHN VAN DOREN YOUNG also reported a case of

CARCINOMA OF THE RECTUM.

This patient was sixty-three years of age, with a previous negative family and personal history. A year ago she developed an attack of cystitis which was treated without any suspicion of other serious conditions being present. In March, 1913, she began to complain of constipation with pain on defecation, there was no bleeding but urination was frequent and painful. Vaginal examination revealed two lumps in the rectum, one on the anus and one about four inches higher up. This was confirmed by rectal examination. From the hardness and location, a diagnosis of carcinoma was made. The patient declined to be operated upon and was treated medically for a month. She finally consented and the operation was done at St. Elizabeth's Hospital, April 4, 1913, by the following method. The elliptical incision of Tuttle was made around the anus from the posterior vaginal wall upward to the coccyx outside of the sphincter ani (which was completely involved in the growth). After loosening up the lower end of the bowel, it was pulled down, cauterized and tied off. An incision was then made posteriorly to and around the cervix, opening the peritoneum. This incision was carried down to the posterior vaginal wall to the original cut, completely exposing the field of operation. The rectum was freed by the method of Tuttle and the bowel drawn so that the peritoneal reflection at the pouch of Douglas was at the anus. The entire sphincter ani muscle had been removed and it was decided to use the levator muscles as a substitute and they were therefore freed in the manner described by Sturmdorf and united posteriorly and anteriorly to the bowel with chromic catgut. The incisions were closed in the usual manner and the patient made a satisfactory recovery with primary union except where the drains had been inserted.

The pathological report of the specimen confirmed the original diagnosis of carcinoma.

Examination one year after operation showed no recurrence and perfect control of the bowel, the patient having resumed her usual habits of life shortly after the operation. The case demonstrated the value and importance of early diagnosis, made possible by the early examination and appreciation of the symptoms instead of simply treating the constipation without determining the cause.

DR. YOUNG also reported a case of

FIBROPOLYP OF THE UTERUS UNDERGOING SARCOMATOUS DEGENERATION.

The patient, thirty-two years of age, was married four years and had one child as the result of a normal delivery. The puerperium was

uneventful and the patient was well until eight months later (December, 1913), when she noticed a foul vaginal discharge. Examination showed a large polyp protruding from the os and filling the upper part of the vagina, which gave rise to the foul odor. Immediate operation was advised and carried out. The polyp was necrotic and the external portion was removed piecemeal. The pedicle was attached to the anterior uterine wall just above the internal os, it was ligated and cut. The remainder of the uterine cavity was empty. The patient made an uneventful recovery.

The specimen was examined by two pathologists who reported it to be an extremely cellular fibroma with occasional mitosis and marked polymorphism of the cells pointing to sarcomatous degeneration. There were no metastases and the type of carcinoma could not therefore be considered very malignant.

On April 6, 1914, another small polyp was removed which on examination proved to be benign although bearing some resemblance in the microscopical arrangement to the first specimen. The patient continued well but in view of the advice of the pathologists, hysterectomy was omitted although such a case must be kept under careful observation.

Dr. Young also reported a case of

EPITHELIOMA OF THE VULVA.

This patient was a widow, seventy-eight years of age, who presented a rheumatoid arthritis with extensive deformities. Six months previously she began to suffer from pruritis vulva and a burning pain on urination. There were no other symptoms. Examination disclosed an epithelioma of the left labium majus and minus. Patient was operated in St. Elizabeth's Hospital, January 13, 1914, under nitrous oxide and oxygen anesthesia, a rapid and complete removal being made. Primary union resulted and the recovery was uneventful. The pathological report confirmed the diagnosis of epithelioma.

DISCUSSION.

DR. ARTHUR STEIN reported the case of a woman, forty-six years of age, who entered the German Hospital with a tumor as large as a child's head. A supravaginal operation was done. On microscopical examination four or five polyps were found in the uterine cavity. The structures were all examined with care and they were surprised to find the presence of sarcomatous degeneration, not only of the polyp but also of small areas in the uterine mucosa. There were also some glands undergoing this sarcomatous degeneration. A supravaginal amputation was done. The patient was asked to return for a total extirpation of the uterus but she did not until it was too late for this operation to be done with success. She died soon afterward. Dr. Stein thought that in all cases where a diagnosis of sarcomatous degeneration was made the uterus should be

removed. It was far safer to remove it *in toto* than to leave any part of it.

DR. JOHN VAN DOREN YOUNG said that doing a hysterectomy at the time did not occur to him because he thought that he was dealing simply with a ploy. This polyp had a long pedicle from its anterior surface just above the internal os. She was a young woman, had but one child and was very desirous of having more children.

ACUTE INFECTIOUS MYELITIS COMPLICATING PREGNANCY.

DR. ROBERT E. POU said that a case of this kind was of such rare occurrence and this one was so well defined that he believed it would be of general interest to the Section. It was more usual to see these cases as the result of caries or syphilis, and even in these conditions they were rare enough to elicit more than casual interest. To discriminate between an inflammatory and vascular origin was actually possible only where an early postmortem had been done. He had assumed that this case was one of acute infection of the spinal cord, probably a transverse myelitis. As a matter of fact the real diagnosis of such cases was usually made at autopsy, and even then the question was a difficult one. As the subject of his report was still alive there was no way of arriving at a definite conclusion. The patient was forty-two years of age and at the time of the onset of the myelitis, was in her sixth month of gestation, this being her fifth pregnancy. There was no history of miscarriages and the past history of the patient was unimportant. During the first week in December, 1913, she became constipated, had headaches, and pain in the abdomen. On December 6, she noticed what she called a stiff sensation in her arms, shoulders, and neck. She had pain in the epigastrium. Her husband sent her to the family physician who diagnosed her case as beginning labor, and gave her a hot pack and a hypodermic. Not many hours after this the patient noticed that her legs were numb and helpless and her urine had to be drawn by catheter. Incontinence of urine and feces followed. She was admitted to the Lying-In Hospital two days later at which time she was paraplegic; knee jerks could not be elicited but there appeared to be sensation. The blood pressure was 140 mm. About a week later the writer saw the patient for the first time. She was covered with fine scales which seemed to be a congenital ichthyosis. She called it a birth mark and said she had had it all her life. The mother attributed it to prenatal influences. The patient was almost completely paralyzed in both legs and there was involuntary micturition and defecation. There was no photophobia, no hyperesthesia, and no pupillary symptoms. She had no headache and her mind was absolutely clear. There were no optic nerve symptoms and the muscles of the face and tongue were normal. Her mouth, however, was absolutely putrid, the teeth being ragged and the gums everywhere inflamed. The breath was very bad. She was deaf in both ears. Further examination a few days later resulted in a diagnosis of middle ear deafness. It was then learned that she had been

hard of hearing for many years. A subsequent examination led to the diagnosis of residual scar condition following otitis media. At this time the patient's arms were normal in both motion and sensation. Babinski was present in both feet, knee jerks could be faintly elicited. There was a slight Kernig's sign.

On admission to the hospital the patient's temperature was normal, but it arose on the fourth day to 101°F ., pulse 120, respirations 24. The following day the temperature dropped to normal and beginning to rise two days later, rose to 103°F . on her ninth day, in the hospital. On one occasion it went as low as 97°F . A spinal puncture was done on the third day after her admission, but no growth was obtained from the culture. A Wassermann done at this time was negative. The blood count was as follows: hemoglobin 80 per cent., red blood corpuscles 3,890,000 index, 1, white blood corpuscles 20,800, polymorphonuclears 88 per cent. Examination of the urine showed a specific gravity of 1016, albumen was present but no sugar and no indican. Urea was 1.9 per cent. There were a few granular and hyaline casts and a small amount of pus, and some epithelial cells and urates. Ten days after admission the leukocytes were 17,200, and polymorphonuclears 89 per cent. Two weeks after admission the leukocytes were 9200 and polymorphonuclears 87 per cent. On her twenty-first day in the hospital the leukocytes were 8000 and polymorphonuclears 84 per cent. Labor occurred December 20, 1913. The speaker said that emptying the uterus at this time was advised by him as the patient had had incontinence of urine and feces and bedsores threatened to develop over the right trochanter. On December 21, the patient was delivered of a six months' macerated fetus. The patient now made an uneventful recovery. The stiffness and retraction of the neck continued for two or three weeks, and then disappeared. The power returned rather rapidly in both legs and the knee jerks increased at the same time. Babinski and Oppenheim reactions were both present. The abdomen remained prominent and showed no reflexes. Bevois sign could not be elicited. The incontinence gradually lessened. At no time during her stay in the hospital could any sensory symptoms be elicited. On February 22, after returning to her home, she complained of distinct girdle sensation in the region of the ensiform. Her reflexes were much increased and she could hobble about the room in a peculiar ataxic manner. One month after admission to the hospital and just before leaving it her spinal fluid was again examined. It showed a negative Wassermann, a negative globulin estimation, and only fifteen cells to the millimeter. Meanwhile the blood count showed on the thirty-third day after her admission red blood corpuscles 4,220,000, hemoglobin 72 per cent., differential was 65 per cent., polymorphonuclears and lymphocytes 3004. The urine remained about as at the time of admission and at no time was a cystitis present. On March 20, the writer went to the home of the patient and took two tubes and had the blood examined at the Neurological Institute and also by the Board of Health. It was of the utmost importance in this case to exclude syphilis. The Neurological In-

stitute had reported a negative result and the Board of Health had not yet been heard from.

It remained to mention the so-called toxic form of myelitis, occurring especially in pregnancy. Accounts of this were vague and unsatisfactory. To distinguish between it and the infectious type was impossible. The presence of the dead fetus would have to be considered.

The treatment depended mainly on emptying the uterus, preventing bedsores, cleanliness, and turning the patient many times during the day. Urotropin was given the patient to prevent cystitis. Massage and electricity were indicated later on. The prognosis was best in just such cases as this where there was incomplete paralysis. The patient would probably always be spastic and have a weak bladder and rectum. Infection in these cases might occur in three ways: (1) As an extension focus from neighboring inflammations, as spinal caries or meningitis. (2) Through the blood stream, as a part of a general pyemia or a purely local phenomenon. (3) Through the lymphatics, Marinesco having traced an infection along the peripheral lymphatics and nerves in a case of gangrene of the leg.

DISCUSSION.

DR. SIDNEY D. JACOBSON reported a case that he saw in London. The patient was a woman with a tumor of the cord and he thought in the dorsal region. She had been paralyzed below the waist for three years. Neurologists pronounced the case one of tumor of the spinal cord. She was pregnant eight and a half months. He thought the uterus might have become paralyzed. However, one morning he was notified that the woman had delivered herself and without pain. The baby was perfectly normal in every way and the patient delivered herself in a normal manner. There must have been a certain amount of muscular power of the abdominal wall and muscles to expel the fetus.

DR. GEORGE W. KOSMAK said that he had the opportunity to follow this case at the Lying-In Hospital and he was impressed by the condition of the mouth as being a possible factor in the woman's infection. There was a fetid condition of the teeth and gums; the mouth was as filthy a one as he had ever seen. Physicians did not usually pay sufficient attention to the teeth and gums. Oral surgeons had demonstrated in recent years that carious teeth might serve as an entrance for a general systemic infection. This patient had a severe gingivitis and the myelitis from which she suffered might have had its source from that locality. The death of her fetus did not produce the inflammatory process which involved the spinal cord. When a dead fetus was carried long there would be a toxemia rather than a bacteremia. Dr. Kosmak was convinced that the source of infection in many cases of pregnancy was due to carious teeth and the fetid condition of the mucous membrane of the mouth.

DR. GEORGE L. BRODHEAD believed that the death of the fetus was merely an incident because there were many such cases where

the fetus was retained an indefinite length of time. Once in a long time they met with a case of mild toxemia. There might be an occasional case where there were sufficient evidences of the toxemia to empty the uterus on that account.

DR. ASA B. DAVIS said that what struck him particularly in the reported case was the gain in health. Her ability to walk about improved her rapidly for a time. Dr. Davis recalled a similar case in a girl of seventeen. She was brought into the hospital with marked symptoms of meningitis which increased in severity. When she arrived she had had an injury on the right jaw caused by being thrown against a radiator. She developed an alveolar abscess. She was eight months pregnant. There were general symptoms of irritability of spinal cord and brain. She had a streptococcemia. Cesarean operation was performed and the child lived a few days. A complete autopsy was made and streptococci were found in the meninges of the brain. Their entrance was probably from the alveolar abscess.

DR. JOHN H. TELFAIR reported a case of

COMPLETE INVERSION OF THE UTERUS FOLLOWING DELIVERY.

The patient whose case is herewith reported was admitted to the obstetrical service at Fordham Hospital, June 29, 1913. She was a para-i, and was delivered of a full-term child about ten hours before admission. Following delivery she had a profuse hemorrhage and when admitted had a complete inversion of the uterus, was gasping for air, skin cold, and had no radial pulse. Her condition was so desperate when she reached the operating room that it was decided that no treatment was possible until her profound shock had been at least partially overcome. Saline infusion, Murphy drip, and the usual quickly diffusible stimulants were given and she commenced to react.

Examination revealed a large, bleeding pear-shaped tumor extending 10 centimeters outside the vulva. This was washed off with hot saline solution and the whole mass pushed up in the axis of the pelvic inlet. There was a sense of firm resistance and upon deep abdominal palpation this was found to be due to a firm circular contraction of the muscle fibers at the cervicocorporeal junction. The patient was given ether to the surgical degree and when relaxed it was found possible to introduce the thumb and three fingers of the left hand into this cup-like depression and actually dilate it as one might dilate a cervix through the vagina. With the left hand still exerting this dilating force through the abdominal wall, he commenced upward pressure on the uterus on the right lateral wall and succeeded in starting this portion through the cervix, then by continuous pressure gradually worked the fundus up, until the whole inverted mass reduced itself with a snap, just as a rubber ball does after having been compressed. The uterus was firmly packed with plain gauze and the patient was returned to bed in fair condition. About four hours after the operation the patient again went into collapse and was given a transfusion of blood. The result was remarkably good.

This patient recovered partially from the primary shock and hemorrhage but left the hospital against advice on the third day. She died of sepsis on the seventh day after delivery.

One would think from looking up the literature on postpartum inversion of the uterus that, next to vagitus uterinus, it is the most uncommon accident that can happen to the parturient woman. The most striking thing about the statistics is the tremendous difference in the various figures. Braun states that it happens once in 250,000 labors, while Kehrer gives one case, in 2000 labors. An average made from statistics of ten different men, is one case in 128,766 labors. This condition is undoubtedly extremely uncommon, but I am of the opinion that it happens more frequently than the above figures seem to indicate. Practically all the figures are based upon hospital records and undoubtedly complete inversion of the uterus following delivery is relatively more common among the practice of midwives and physicians who would not report the cases.

DR. GEORGE L. BRODHEAD called attention to the relaxed uterus which followed the Credé method employed in a violent manner. Also long labors and deliveries with low forceps. Dr. Brodhead instanced such a case in which upon examination he found the fundus of the uterus down. With the hand in the uterus he removed the placenta and pushed a cup-shaped depression upward. The employment of violent Credé method was responsible for these cases of inversion of the uterus following delivery.

DR. JOHN VAN DOREN YOUNG asked Dr. Telfair if he considered the question of hysterectomy in the case reported.

DR. TELFAIR replied that he thought it possible that hysterectomy might be necessary but he thought it better to attempt manual replacement first. The question of anesthesia in these cases was an important one.

VAGITUS UTERINUS WITH THE REPORT OF A CASE.

DR. GEORGE L. BRODHEAD said that a case of vagitus uterinus had been reported in the New York Medical Journal, October 2, 1913, by Telfair. At that time it was stated that until very recent years every paper on this subject had aroused a storm of criticism, sometimes ridicule. This criticism was not limited to the profession in general, the bitterest usually came from obstetricians of wide experience. These men were frank to say that they had never seen a case, and did not believe that anyone else ever did. At the close of his article Telfair stated that of forty-four reported cases more than one-half were operative deliveries; eleven being forceps, fifteen versions, and one replacement of arm and cord. The fetal mortality was 10 per cent., many of the surviving children living only after prolonged efforts at resuscitation.

The history of the case reported was as follows: Mrs. C., a para-vii, a patient in the Post-Graduate Hospital, went into labor March 24, 1911, at 8 P.M. The first stage lasted ten hours, and during this stage the membranes were ruptured artificially. The

second stage was prolonged and it was decided to apply forceps. The head was below the brim, the fetal heart was 140 to 150, the patient's pulse 128. The interne who was in charge of the case stated that the right hand was introduced to the left ear, and he was about to introduce the left blade when he heard a distinct loud cry from the baby, the cry being heard also by the anesthetist, by a woman in the same room, and by another woman who was in the adjoining room. The cry continued at intervals from that time until the head was extracted thirteen minutes later. Traction was continuous and the delivery was completed as soon as possible. The child had a good color, was in good condition, and weighed 10 pounds, 10 ounces. To the list of reported cases one other could be added which was reported by Marx to the New York Obstetrical Society, a full report of which was to be found in the *Transactions of the New York Obstetrical Society*, 1906-1907, page 257. Marx stated that he had heard such a cry once before in his experience. When asked to discuss this case of Dr. Marx's, an eminent obstetrician, a member of the Society, stated that in his opinion such a cry was impossible. This only bore out what Telfair had already stated, namely, the sincere doubt which had existed in the minds of men even of large experience, with reference to the possibility of a uterine cry. Both of the men who were in charge of the case reported were thoroughly reliable observers, and there was absolutely no doubt in his mind Dr. Brodhead said as to the correctness of the report in every detail.

DR. MALCOLM McLANE said that the case he had reported was an undoubted one. The fetal head was well up in the uterus. There was a suction and he was astounded to hear the child cry and this continued for several minutes. There was present a superstitious nurse who spent most of her time on her knees. This case he had reported carefully. He had seen many cases where the child cried in the vagina but he did not think they were worthy of reporting. In this case the child was well up in the uterus.

DR. TELFAIR asked if this was an operative case.

DR. McLANE replied that the case was being prepared for operation when there was this suction of air into the uterus and which accounted for the cry.

DR. TELFAIR said that critics maintained that it was impossible to speak of what one heard. Some cases were explained by a vibrating fold of mucous membrane.

DR. BRODHEAD asked when this report appeared.

DR. McLANE said the report appeared in the records of the AMERICAN JOURNAL OF OBSTETRICS probably sixteen years ago. The case was reported in full at the meeting of the New York Obstetrical Society about sixteen years ago.

SPONTANEOUS EVOLUTION OF SHOULDER PRESENTATION.

DR. BRODHEAD stated that shoulder presentations were said to occur about once in 200 labors, and according to Edgar (The Practice of Obstetrics, 4th Edition) spontaneous evolution occurred in about 8 per cent. of all cases, if unusually small children,

premature births, etc., were included. It was well understood that there were three factors which must be present to make this spontaneous termination possible, these being large pelvis, small child, and strong uterine contractions. The birth of a full-term living child had never occurred by spontaneous evolution, the heaviest child born alive having been reported by Langemeister, the weight being 2700 grams. The writer had seen these cases and owing to the rarity of the mechanism, he felt that a report of these cases would be interesting. In each case the mechanism was that described by Douglas.

CASE I.—This patient was seen in consultation September 25, 1901. She was a multipara, seven months pregnant, and had been in labor for eighteen hours before. At this time a shoulder presentation was found, the right arm lying in the vagina. Preparation was begun for a version but in a few minutes the patient was seen to be having strong expulsive pains; the arm steadily advanced, then the right chest appeared, then the trunk of the fetus, with extreme lateral flexion, then the lower limbs, and finally the opposite shoulder and head of the stillborn fetus. The child was macerated and measured 14 inches in length. There was no hemorrhage; the placenta was expressed by the Credé method, and the recovery was uneventful.

CASE II.—This patient was para-iv, about seven and one-half months pregnant. She was admitted to the Harlem Hospital on November 28, 1913, at 4.45 P.M. with the diagnosis of breech presentation. Six hours later the cervix was almost completely dilated, with presentation of the left shoulder, the left arm lying in the vagina. The pains were very strong. Soon the shoulder appeared at the outlet, followed by the chest, the doubled up trunk, the breech and lower limbs, and finally the opposite shoulder and head.

The female child was stillborn, and weighed $4\frac{1}{2}$ pounds. Recovery was uneventful.

CASE III.—Mrs. T., para-ii, was admitted to the Harlem Hospital on January 9, 1914, at noon, the cervix admitting three fingers, the presentation L. O. A. The membranes ruptured at 8.20 P.M. and at 10 P.M. a macerated male child weighing 5 pounds and 10 ounces was born by the same mechanism that was reported in the previous two cases. The puerperium was normal.

DR. CHARLES GOODMAN in presenting some of his recent work on the serum reactions in the presence of cancer said that Abderhalden had demonstrated that stimuli, whether experimental, physiological or pathological, were capable of elaborating "protective ferments" in the blood. A. first demonstrated the presence of a specific ferment during pregnancy; this biological test promised to be the key to a vast, but as yet unexplored, field of seropathology.

At the Beth Israel Hospital his assistant and himself had tried the Abderhalden dialysis technic in various groups of sera obtained from clinical material as well as from animals, and as the paper of the evening dwelt upon the subject of serotherapy in cancer, Dr. Goodman thought it would be of interest to relate briefly their findings in a few cases of malignancy.

Their material at the Beth Israel Hospital had been limited and some of the specimens obtained elsewhere had unfortunately become contaminated or improperly handled, causing the blood to lake, and rendering these specimens unfit for use; the presence of hemoglobin in the serum was bound to give misleading results.

As more data would be collected it would be of intense interest to see how nearly the diagnosis of the presence of malignancy could be elicited and perhaps assist one in establishing a diagnosis in those obscure cases in which by the other methods this had been impossible.

The following table shows the series of cases and the results of the serum test:

Case	Diagnosis	Serum	Serum and Carcinoma	Remarks
P.P.L. 1	Recurrent Car. breast	.....	.....	Operated four months previously
P.M. 2	Car. breast	.....	.....	Four and one-half years after operation, vertebral pain.
M.Z. 3	Car. liver	.....	.....	Cachexia; icterus.
M.L. 4	Cac. rectum	.....	.....	Inoperable; colostomy.
M.F. 5	Cac. uterus (?)	.....	.....	Cervix removed; no microscopic report; Wasserman, improved with "606."
B.I.H. 6.	Cac. stomach	.....	.....	Exploration; inoperable.
L.F. 7.	Cac. stomach	.....	.....	Partial gastrectomy four months previous.
M.H. 8.	Cac. breast	.....	.....	Recurring with metastasis.
M.G. 9.	Cac. breast	.....	.....	Recurring with metastasis.
M.G. 10.	Cac. face	.....	.....	Radiotherapy.
F. 11.	Cac. breast	.....	.....	Metastasis.
M.U. 12.	Sarc. fem.	.....	Serum and sarcoma	Pelvic metastasis.
B.H. 13.	Retroperitoneal tumor	.....	.....	Pelvic sarcoma operated three years ago.

DISCUSSION.

Dr. S. H. GEIST said that in the chemical laboratory at Mount Sinai Hospital, Dr. Epstein and he had been investigating the Abderhalden reaction in pregnancy. They adhered strictly to the technic as described by Abderhalden and in fact were in personal communication with him in relation to the work. The results have been very discouraging. Dr. Geist felt that numerous investigators must have had similar experiences but have hesitated to publish them for fear of the criticism of improper technic.

Losee and Jellinghaus, in a large series of cases investigated at the lying-in Hospital, New York, after many difficulties arrived at the technic which gave them very good results. A subsequent series with the same technic gave bad results, which he did not believe had been published up to the present.

In relation to the test in carcinoma, Dr. Crohn, working in the laboratory at Mount Sinai Hospital, in a fairly large series of cases had very disappointing results. His early cases gave great promise, but the same technic extended to a larger series did not result very favorably. It would seem from these experiences that the poor results cannot be attributed entirely to faulty technic.

RESULT OF THREE YEARS' OBSERVATION ON A NEW FORM ON CANCER TREATMENT.

DR. WILLIAM N. BERKELEY read this paper.

He said that the first two of the three years' work described in this paper was done at the Loomis Laboratory of Cornell University, with the helpful advice and sympathy of the Director, Prof. S. P. Beebe, and with valuable financial aid from the Trustees of the Huntington Cancer Research Fund.

By way of introduction he remarked as in his first paper on this subject two years ago before this Section, that local remedies for cancer, such as radium, x-rays, and fulguration, cannot meet the indications in full, for typical cancers *metastasize*, and the secondary growths develop in distant internal organs where local treatment is impossible. A scientific remedy for cancer, therefore, must be one soluble in the blood, transferable to all parts of the patient's body and possessed of a selective affinity for the cells of the tumor to be destroyed.

In view of the many successful immunity studies in the case of the bacterial cell, it is but a step to conceive the plan of a similar attack upon the cancer cell. The idea was advanced years ago by V. Dungern, and an immense bibliography was published by E. Vidal in 1911. Beebe's success with a thyroid antiserum in 1906 gave a further stimulus to the cytotoxin idea in this country, and the human ascitic fluid used so successfully by Eugene Hodenpyl is believed to have been of the same general character. Dr. Berkeley believes that perhaps the measure of success that has attended his own work where so many others have failed, has come largely from careful attention to small details.

For a "surgical cure" of cancer, four or five years are usually demanded; hence the present results are provisional only, although worthy of comment.

Dr. Berkeley used his serum upon many kinds and many clinical stages of malignant growths. Out of 104 cases seen, only fifteen were turned away. Of all the malignant growths removed by primary operation microscopic sections are in his possession except in three instances. The clinical diagnosis was made in nearly every case by from two to a dozen surgeons. Diagnostic errors were believed to be negligible.

The serum has been given into the vein or under the skin in doses of from 5 to 50 c. c., at intervals of a few days. It has been mostly given unmodified except by inactivation. Latterly much better results were obtained from a serum concentrated by the

method of E. J. Banzhaf, of the New York Department of Health. Anaphylactic effects have been much as formerly reported. There were two cases (out of several hundred injections) in which "anaphylactic shock" developed, but the patients made a rapid and complete recovery. By suitable precautions such accidents may be avoided.

In the matter of laboratory tests of the efficiency of the various sera sent out, a *complement fixation test* has been devised (rigid Wassermann technic) that is not only practicable but delicate enough for every clinical purpose.

After early operation we are able to judge of cure only by the failure of the growth to recur in a given time; but in treating secondary growths one may reasonably rely on the following criteria: (1) relief of pain, (2) shrinkage of the tumor, (3) gain in weight.

As in the case of all therapeutic sera, *immunity* antitoxin develops after six or eight doses, and with some happy exceptions the indications are that a cancer which cannot be cured by six or eight maximum injections will not be amenable to the serum treatment. Clinically this confines the treatment to

(1) Destruction of microscopic remnants left after a primary operation.

(2) Production of immunity to cancer in persons not yet clinically ill of the disease, but affected by one of the "precancerous" conditions. (3) A very few early and localized recurrences will probably be curable.

Eighty-nine cases were regularly undertaken. For reasons not referable to the serum treatment, seventy-one only may be counted, thirty-two secondary or inoperable, and thirty-nine treated after primary operation. Of the secondary cases none were cured, but from the point of view of the research the results have been of prime importance. About two-thirds of them made a favorable response for a certain period. Case 20 had a foul ulcerated recurrent breast tumor, 3 inches in diameter. The ulcer healed in six weeks and in two months nothing was left of the growth save a nodule as large as a chestnut. Case 3 had a huge infiltrating cancer of the left lower jaw starting in the oral mucosa near the tonsil. Pain was entirely relieved for six weeks and the tumor reduced to half its size. Out of a number of others more or less remarkably improved, a case of Dr. John Van Doren Young deserves special mention. In this case (of recurrent breast cancer) a large number of cutaneous nodules around the scar of the operation wound softened, dimpled, turned black, dried and fell off after six injections.

There is nothing in the literature of the action of normal heterologous serum like this; it seems unreasonable to suppose that such effects can result except from a specific antibody.

Of the thirty-nine cases treated after a primary operation it must be noted that the natural tendency of surgeons after a complete and clean primary operation is to hope for the best and trust to the operation alone for cure, only referring their cases when such

hope is manifestly gone. Consequently the primary list, to begin with, was an unfavorable one. Furthermore, the amount of growth and its circulatory accessibility is always in a measure conjectural and the correct dose of serum (quantitative relation) is correspondingly in doubt. However, if we count out four cases in which a large and rapidly growing cancer recurred in the wound within three weeks following operation (before any serum was available), and three more in which liver and spleen were already enlarged when the operation was done, there have been seven failures. The speaker said that these might be explained away but it was fairer simply to call them failures. Of the nonrecurrent cases, those still well after nine months of course prove little, but with quite a number among the apparent cures (all of them called by the surgeons "bad cases") the interval since operation was from two to three years. In two of these cases there was a distinct and palpable mass left behind, which appears to have been destroyed by the serum.

As to the propriety of publishing this report it is true that the cases thought to be cures have not been sufficiently tested by time; but unless the exact limitations of the serum treatment are carefully set forth, Dr. Berkeley said that he would continue to receive only the moribund and hopeless cases. He decided therefore to publish his account simply as a statement of progress to date.

DISCUSSION.

DR. L. GRANT BALDWIN reported three cases out of one dozen that had received 30 c.c. of the serum intravenously. One or two of them felt faint after the injection. Two or three, after receiving the dose in the muscles, developed a severe urticaria which lasted about one week. This did not interfere with their regular work.

CASE I.—Breast case. This was a young married woman of forty-two years who had this tumor of the breast for years. Two or three years ago the axillary glands became involved and at the time of the operation on the breast five glands were removed from the axilla. The growth was the size of a silver dollar. She had many doses of the serum. The operation was done two years ago last June and since she had gained in strength and was now a suffragette. In Dr. Baldwin's experience he said he had never seen as bad a case as this who was left in such good shape after the operation and use of the serum.

CASE II.—Sigmoid case. This woman appeared March 4, 1912, and he made a diagnosis of tuboovarian disease with laceration. The abdomen was opened and the diagnosis was found to be incorrect. There was a mass in the lower sigmoid and the gut was immovable, so much so it was impossible to get beyond it. He thought it would be better to leave it alone and make an artificial anus which he did. After reading Dr. Berkeley's article he placed the matter before her husband and consent to the operation was obtained. She since had gained 20 pounds and was in comparative good health.

Case III.—Cancer of the cervix. This was a case of rapidly recurring cancer of the cervix. After the operation she was without recurrences for three years when there was a rapid recurrence. She did well then on the serum for three or four weeks when the serum seemed to lose its effect and she succumbed to the disease.

Case IV.—Breast case. This woman had a small nodule, received the serum and was now well. He said he did not feel justified in claiming anything for the serum in this case.

DR. JOHN VAN DOREN YOUNG reported the case of a woman whose history was extremely interesting to him. She started with recurrences two months after the operation on her right side. He took out nineteen nodules at one sitting. Immediately after, he read Dr. Berkeley's paper. Dr. Beebe helped him in getting the stock serum. The results were the most remarkable he ever saw. There were thirty-five nodules under the skin which disappeared. Immediately after the first injection no more nodules appeared. The patient left him because he would not guarantee her a cure and she went to Spain where he thought she died of mediastinal carcinoma. The work of Drs. Berkeley and Beebe gave food for thought and it seemed to Dr. Young that they should help Dr. Berkeley in his work. Serotherapy was logical and they should give the doctor every case, not merely the moribund cases, to work on.

REVIEW.

A REFERENCE HANDBOOK OF THE MEDICAL SCIENCES. Embracing the Entire Range of Scientific and Practical Medicine and Allied Science. By various writers. Third Edition, completely revised and rewritten. Edited by THOMAS LATHROP STEDMAN, A. M., M. D. Complete in eight imperial quarto volumes. Volume III. 934 double-column pages, illustrated by 659 engravings and 7 full-page plates in colors. William Wood & Company, New York, 1914. Price net, \$7.00 cloth; \$8.00 leather; \$9.00 half-morocco.

The present volume of this up-to-date work of reference shows evidence of most thorough revision. It contains 539 articles, from Chloroma to Embryology. Among those relating to gynecology and obstetrics are those on the chorion and decidua, curettage, cystadenoma, and eclampsia. Among the numerous pediatric subjects are chorea, cleft-palate, dentition, diarrhea and diphtheria. Articles of general interest include climate and various health resorts, color perception and tests, asexualization of criminals, deaf-mutes, disinfectants, dislocations, diseases of the ear, eczema, and a particularly clear presentation of diabetes. Many of the shorter articles are equally satisfactory and show thorough grasp of the subject by their authors. Numerous biographical sketches are included in this volume, which, while passing under the modest title of reference handbook is really a complete encyclopedia of the medical sciences.

H. D.

BRIEF OF CURRENT LITERATURE.

OBSTETRICS.

Carbonic Acid Gas in Hemorrhages of Delivery.—Eglier and Vayssiere (*Bull. de la Soc. d'obst. et de gyn.*, January 1914) state that carbonic acid gas affects the action of unstriated muscle fibers and thus causes asphyxia. Hence it may also be a danger in obstetrics, causing inertia uteri and hemorrhages. An atmosphere that is vitiated by crowding without ventilation may thus be a cause of obstetric accidents. The authors relate a case in point in which they themselves were affected by the closeness of the room, so as to cause the opening of the window. At the same time that the air revived the operators the patient also began to revive and her hemorrhage to lessen. Here the carbon dioxide seems to have caused inertia. Accoucheurs should see that ventilation is sufficient for the sake of the patient as well as of themselves.

Diagnosis of Puerperal Gonorrhea by Laboratory Methods.—Fabre and Dujol (*Bull. de la Soc. d'obst. et de gyn.*, January, 1914) have tested various laboratory methods of diagnosis of puerperal gonorrhea. They used vaccino-diagnosis in seventeen cases and found that although encouraging, this method does not yield sufficient proof of gonorrhea. Culture seems even inferior to it and not practical. The direct bacteriological examination is much to be preferred to both, and is at once exact, simple, and practical.

Influence of the Gonococcus on the Puerperium.—Fabre and Dujol (*Bull. de la Soc. d'obst. et de gyn.*, January, 1914) question whether women suffering from gonorrhea are more susceptible of infection than others, and whether the gonococcus alone can be the cause of sepsis. Literature shows that there are either local reactions in gonorrhea, such as endometritis, salpingitis, parametritis; or generalized reactions, peritonitis, septicemia and arthritis. The authors believe that the streptococcus is the primary cause of these affections, and that the gonococcus is simply present with the streptococcus. Nor does the streptococcus combined with the gonococcus act more severely than without it. Gonococcic autoinfection is characterized by its rarity and its severity. Gonorrheal endometritis is more frequent but is a benign affection. During six months, out of 600 women delivered at the Clinic, 31 were suspected of combined septicemia and gonococcemia, yet there were 150 who were to a greater or less degree affected by gonorrhea. In the great number of these delivery and puerperium passed normally, without septicemia. Of the thirty-one suspected cases nineteen were demonstrated to be gonorrheal, and three others gave a reaction for gonorrhea, that is, twenty-two in all. Four of these cases had fever arising from the streptococcus or colon bacillus; eight had fever from the gonococcus; four had but a passing rise of temperature; ten had none. Mild affections resulting from the gonococcus are purulent lochiæ, retarded involution and abnormal

permeability of the os, inconstant and moderate fever, and accelerated pulse with general good condition. The authors conclude that it is generally the streptococcus which causes septicemia. Severe septic lesions are found in women who are already suffering from parametrial and tubal suppurations. There the trouble may be wakened up and result in severe septicemia and peritonitis. We must distinguish between gonorrheal affections limited to the uterus and those which have already passed beyond it into the parametrium. Puerperal salpingitis thus results from gonorrhea and renders the subject sterile.

Antiplacental Proteolytic Ferments in Serum of Pregnant Women.

—G. Ecalte (*Arch. mens. d'obst. et de gyn.*, March, 1914) says that Abderhalden has shown that there are present in the serum of pregnant women specific proteolytic ferments reacting toward albumins, and has devised methods of showing the presence of these ferments. The author believes that it is the ferments of defence that Abderhalden has found, and he has also established the specificity of their action and their affinity for different varieties of albumin heterogeneous to the plasma. The author has repeated these researches on pregnant and nonpregnant, normal and pathological women. Of the pregnant women there were 109, and the reaction has always been positive, but in varying degrees. The same serum has been used with different placentas, in 142 cases, at different epochs of pregnancy. He has thus shown that the serum of the pregnant woman at all periods of pregnancy contains antiplacental proteolytic ferments. Of nonpregnant women there were sixty-three. In forty-three there was no reaction. As to the diagnostic value of the reaction the author cannot give absolute conclusions. The reaction becomes negative three weeks after labor. Its intensity is influenced neither by the period of pregnancy nor by the nature of the placenta in the normal woman. The action of the blood of the cord on the placenta often fails and is feebler than that of the mother. In case of a dead fetus with retention of the placenta the reaction may fail. In extrauterine pregnancy the reaction is always positive while the fetus lives, but may be negative when it is dead. No certain conclusions can be arrived at with reference to eclamptics. In grave incoercible vomiting the reaction diminishes or disappears. Of nonpregnant women 70 per cent. were negative to albumin; 30 per cent. gave a positive Abderhalden reaction, but less intense than in pregnancy.

Value of Abderhalden's Tests in the Diagnosis of Pregnancy.

Reviewing the literature of Abderhalden's tests for pregnancy. R. L. M. Wallis (*Jour. Obst. and Gyn. Brit. Emp.*, 1914, xxv, 53) says that the serum of pregnant women contains a specific ferment capable of digesting placental tissue, and this ferment can be detected from the eighth week of pregnancy until ten days after delivery, both by the optical and by the dialyzation test. Both tests should always be applied to the serum from the same case, and the accuracy of the results depends entirely upon the most scrupulous care in details of technic. The tests appear to be of value in diagnosis, more espe-

cially in the following conditions:—(a) the early diagnosis of pregnancy; (b) the differential diagnosis between fibromyomata and pregnancy; (c) the diagnosis of ectopic gestation; (d) the diagnosis of chorion-epithelioma; (e) the presence of retained placenta. There is at present no justification for stating that the serum of pregnant women will digest other than placental tissue. The claims of Abderhalden that the optical and dialyzation tests are of value in the diagnosis of pregnancy are established.

Jaundice of Pregnancy Associated with Jaundice in the Offspring.

—F. E. Tylecote (*Med. Chron.*, 1914, 4.s. xxvi, 465) records a case of recurrent jaundice in eight successive pregnancies, eventually with xanthoma and persistent, and jaundice in all but the first of the eight children, fatal in six of the seven cases. Rolleston has reviewed the literature and has recorded the only previous case of recurrent jaundice of pregnancy of the mother associated with successive and fatal jaundice in the offspring. In his case there were four successive pregnancies, all with jaundice, with fatal jaundice in three successive infants. In the fourth pregnancy the mother was under treatment with urotropin and salicylates, and did not develop jaundice till the sixth month; the child, born at 8½ months, was not affected. None of her children were breast fed. The case now recorded is like Rolleston's but has several points of difference:—(1) the pregnancies and the offspring were more numerous, (2) the only child which was at any time breast fed, is the only one who survives—a blow to the maternal toxin *via* the milk theory in a way, though this child did indeed contract jaundice, but recovered, (3) the mother has, since her last pregnancy had persistent jaundice, and (4) she has also had, since August, 1908, a widespread, mainly papular, xanthomatous eruption (xanthoma multiplex).

Transfusion of Blood in Rupture of Uterus in Labor.—M. C. Sauvege (*Bull. de la Soc. et de gyn. de Paris*, March, 1914) believes from personal experience that when we have a case of ruptured uterus during labor, it will be of the greatest value to the patient if we are ready to do a transfusion of blood as soon as we have performed hysterectomy. Although there may be cases of rupture in which the hemorrhage is so rapid and severe that there is not time to do a transfusion, still in most cases if we are prepared the life of the patient may be saved by this procedure. The operation is very simple and may in emergency be done without any other armamentarium than a suitable paraffined glass tube. Transfusion should begin as soon as the last ligatures are tied. It will at once relieve the anemia of the patient, and will bring back to life at once a patient practically moribund. It is also indicated to combat severe shock, such as follows rupture.

Radiography of the Fetus in Utero.—Potocki, Laquerriere, and Delherm (*Jour. de méd. de Paris*, No. 9, 1914) have found that with a strong equipment it is quite possible to obtain a good x-ray photograph of the fetus in utero. They have made use of the ventral, dorsal and oblique positions with success. It is not necessary to place the patient in the disagreeable position on the stomach, since as good a view can be obtained with her on the back. It is necessary to

place the apparatus so that a portion of the maternal skeleton will not obscure the view of the fetal parts. The intensity of the rays is more important than the position of the patient. The x-ray tube should be placed beneath the table, the plate over the abdomen. An image of the whole fetus is obtained, and its position and stage of development are seen. If we desire to know the relation of the head to the pelvis we incline the tube obliquely to the axis of the superior strait. The slight ossification of the fetal skeleton and the thickness of the maternal walls operate against a good picture. The edematous walls, the uterus engorged with blood, and the amniotic fluid all obscure the image. The patient should have a douche, and be purged before the picture is taken. At term the amount of engorged intestine is a hindrance, and early in pregnancy the gas in the intestine is equally confusing. In spite of these factors we may get a good picture during the last two months of pregnancy, showing the vertebral column, head, limbs, hands and feet. Satisfactory images may be obtained at the sixth and seventh months.

Lipoids of the Liver in Mother and Fetus.—Ugo Sella (*Ann. di ostet. et gin.*, March, 1914) says that up to the present time researches as to the fats of the pregnant liver have not considered the lipoids, but only the true fats. Blot has shown that not only the pregnant but the menstrual liver may show modifications and that a fatty liver may be seen in animals at the end of pregnancy. Tarnier and Simon have shown the same in women. The author has studied livers of rabbits and guinea-pigs. In the early part of pregnancy he found no fats in the livers and there were no changes at all in the liver. In late pregnancy there were fatty drops, representing lipoids, moderate in quantity, in the protoplasm of the liver cells, having no predilection for any special part of the hepatic acinus. The nuclei of the cells were present and unaltered. These drops consisted of mixtures of lipoids with soaps and acid fats. It is a question whether these fats represent a nutritive material in the broad sense, or a degeneration, and whether it is dependent on excessive production, or scanty consumption. The fetal livers of thirty animals were examined and the results are tabulated. In the first part of pregnancy the fats are neither soaps, nor free acid fats, nor pure neutral fats. They are probably mixed lipoids, phosphates, cholesterin, and neutral fats. In later pregnancy the fats are principally ethers of cholesterin. These lipoids are disintegrated in the manufacture of other tissues. They may represent infiltration with fats, coincident with gravidic lipemia in the mother. They are destined to disappear after birth, being used for the functions of the organism. A few days after birth the liver is free from fats.

Iso-serum Treatment of Incoercible Vomiting of Pregnancy.—The theory has been advanced that during the stage in which the chorionic villi flourish, and up to the time when they all disappear except the portion that has given rise to the placenta, the syncytial cells that cover these villousities secrete a species of poison which, when taken up in the maternal circulation, intoxicates the mother and produces the early vomiting of pregnancy. The presence of this

toxin determines an antibody reaction, and on the more or less prompt and effective response on the part of the mother's organism depends the degree of vomiting; if early and vigorous the patient only experiences a little squeamishness that soon passes off, but if tardy or lacking the serious forms of vomiting occur. According to this theory, also, the relative absence of vomiting in later pregnancies is due to immunity acquired through the elaboration of these antibodies. On the assumption that the various forms of the auto-intoxication of pregnancy are due to deficiency in the patient's blood of certain substances which in normal cases are present in suitable amounts is based the treatment by injections of serum taken from a normal pregnancy at a corresponding stage of development. C. K. Austin (*Med. Rec.*, April 18, 1914) presents a review of the cases which have been so treated up to the summer of 1913. From these reports it will be seen—if we set aside two cases in which horse serum was used, and Freund's last paper, of which the details are lacking—that the iso-serum treatment of the autointoxication of pregnancy has been applied in twenty instances, as follows: Vomiting, nine (one failure); eclampsia, four; herpes gestationis, five; less well-defined conditions, two (one failure); and that with eighteen patients it succeeded, sometimes quite dramatically, while with only two did it result in failure.

Nonprotein Nitrogen of the Blood in Pregnancy and Eclampsia.

—C. B. Farr and P. F. Williams (*Amer. Jour. Med. Sci.*, 1914, cxlvii, 556) find that in normal pregnant women the total nonprotein nitrogen does not exceed 30 mg. per 100 c.c. of whole blood. In general hospital cases without demonstrable renal lesions it may frequently reach 40 mg. or more. Slighter disturbances of function are therefore more clearly defined in the former class. In all their cases of pregnancy in which there was definite renal insufficiency or eclampsia, with one exception, there was always a slight, and in most cases a considerable, increase in the total nonprotein nitrogen. The degree of retention was similar to that found in parenchymatous nephritis rather than the higher grade common in the interstitial variety. It bore no definite relation to the severity of the symptoms. In only one case did the figures reach a height which, according to Strauss, would suggest a dubious prognosis. This patient died, as did another with much less retention. The writers believe that the presence of a rising blood pressure, the condition of the urine, as regards albumin and casts, and the general clinical picture are severally more important than the study of the nonprotein nitrogen or the phthalein test.

GYNECOLOGY AND ABDOMINAL SURGERY.

Homo-stimulating Lipoids of the Ovary.—M. H. Iscovesco (*Rev. de gyn. et de chir. abd.*, March, 1914) divides internal secretions into two classes: those necessary to the normal function of various other organs, and those necessary to fix, or neutralize poisons made in the economy, which by accumulating might produce poisoning of various

degrees. We may use these lipoids—to take the place of the secretions of removed organs or those that are not functioning. There are phenomena generally regarded as resulting from hyperfunction of a gland such as enlargement of the gland and sensibility of the structure, and there are anatomical data. In administering any secretion we give several different substances, some homo-stimulant, and others hetero-stimulant. From some glands we can extract definite chemical substances with specific physiological properties, and belonging to the group called lipoids, and which act as auto-regulators of the organs. These lipoids act like internal secretions. The thyroid contains a series of lipoids, some with toxic, some with physiological properties. There are homo-stimulant and hetero-stimulant lipoids. The ovary and testicle have lipoids that are homo-stimulant and excite the organs themselves. When one of these glands is in hyperfunction it secretes a large amount of its exciting substance and this results in a hypertrophy of the organ. The organs of internal secretion contain very different substances, and some that are antagonistic to each other. The author has made a study of the lipoids of the ovary and corpus luteum. He has used their lipoids experimentally in rabbits and has caused the uterus and ovaries to become twice and three times the ordinary size. Large doses cause paralysis in young animals showing that this lipoid fixes itself electively on the genitospinal tissues. Small doses excite these centers, and large doses cause congestion and paralysis. Each medullary center dissolves more easily the homo-stimulant lipoid coming from the organ that is ruled by that center. There is a sort of regulative mechanism at the basis of which are found physico-chemical differences between the various medullary centers. The ovary secretes a substance that acts on various other organs, and another that stimulates itself. Appearance of the menses is influenced by this substance. At a given moment by accumulation of the secretion or by hypersecretion allied to the evolution of the follicle hyperemia of the uterus is produced which goes on to oozing of blood. If ovarian inhibition occurs menstruation is suppressed and vasomotor and trophic symptoms occur with genital sclerosis. The action of the ovarian lipoid is exerted on the ovary, uterus, and thyroid; not at all on the suprarenals, heart, liver, or kidneys. The author has made use of this lipoid clinically, by hypodermic injection and in pills. He uses a 2 per cent. solution giving 1, 2, or 3 centigrams or five to ten pills of 2 centigrams. He gives his results in forty cases of dysmenorrhea. Used for two weeks before menstruation the pains have ceased entirely. In amenorrhea of ovarian origin the menses are brought back by its use. In the menopause the absence of the corpus luteum is responsible for the symptoms observed. The author believes that the secretion of the corpus luteum is the same as that of the ovary, but stronger. Its use relieves remarkably the menopause symptoms. It also influences symptoms of senility in women. Injection of extract of the corpus luteum causes postpuerperal uterine involution to be more rapid. The author gives case histories of patients in whom he has used these lipoids therapeutically in all the ways mentioned.

Dermoid Cysts of the Vesicouterine Wall.—Vautrin (*Jour. de méd. de Paris*, No. 9, 1914) finds that the situation of a dermoid cyst between the anterior wall of the bladder and the uterus is somewhat rare. It rests upon the bladder and pushes the uterus backward. It does not infiltrate the broad ligaments. The cysts contain products of the layers of the blastoderm, especially the ectoderm, as do cysts in other places. They are seen between the ages of twenty and fifty. The symptoms of bladder pressure are most important. The tumor is felt just under the abdominal wall, and the heaviness due to crowding back of the uterus is painful. In some cases the cyst opens into the bladder and symptoms of sepsis may occur. Various forms of germs are found to cause the infection, most frequently the typhoid bacillus. The suppuration may cause ascending urinary infection. Putrefaction of the growth in the abdomen may cause serious septic symptoms. Treatment is by removal of the tumor.

Relation between Blood Serum and Cancer Cells.—Arturo Manna (*Ann. di ostet. e gin.*, Feb. 28, 1914) follows the studies that have been made of the biochemistry of cancer. He has repeated some of the experiments of Kraus and Graft, and has obtained similar results. They studied the action of serum of various kinds on cancer cells; the sera were from pregnant women, and from the umbilical cord. They concluded that the serum of pregnant women dissolves the cancer cells, while that of the umbilical cord has no effect. The author used serum of healthy women, of women suffering from gynecological diseases, of the retroplacental site, of the umbilical cord, and of pregnant women. The cells were obtained from cancers removed by operation, or from the cadaver. He triturated the tissues in a porcelain mortar, to the resulting suspension applied the sera. He found that there are cytolytic sera for cancer cells, or to put it better, there are cancerolytic sera. The serum of cancerous persons has no effect on cancer cells, while the serum of noncancerous persons dissolves them. But if this serum is kept for two hours at a temperature of 55° it loses this power. The serum of umbilical cord has no effect. He concludes that the individual has within himself substances that destroy cancer cells, which are not altered by pregnancy, but which may be destroyed by a cancerous growth. Further study of these phenomena may assist in finding a test for pregnancy or a remedy for cancer.

Fibromata Distant from the Uterus or Aberrant.—M. Goullioud (*Rev. de gyn. et de chir. abd.*, Feb., 1914) says that under two conditions of development fibromata may entirely lose their connection with the uterus from which they have originated: either they may be separated by the length of the broad ligaments, or they may have become entirely detached by torsion of the pedicle, and have become grafted onto some other abdominal organ. The author operated on a large mass of fibroids of the uterus, and also found a chain of other fibromata along the broad ligament and lumbar peritoneum. These were separate from each other and from the uterus, but their uterine origin appears certain. Such tumors appear capable of development wherever the layer of unstriped muscle fibers is found. Their origin

is the same as that of uterine fibromata. There is much evidence to show that this is dependent on prolonged virginity, celibacy, or voluntary sterility. Detached tumors may be found among the folds of the intestines but are rare. The author's second case showed a fibroid attached by many adhesions to a loop of sigmoid, a loop of ileum, and the mesentery. This was coexistent with a fibroma of the uterus. It was evident that there had been torsion of the pedicle of the fibroid and gangrene and attachment of the fibroid elsewhere. The adhesions had permitted of its nourishment. Surgical interference is necessary in these cases.

Hysteropexy and the Operation of Dolèris.—Georges Rouhier (*Rev. de gyn. et de chir. abd.*, Feb., 1914) thinks that the operation of Dolèris has not had the popularity which its excellent results have deserved. Direct hysteropexy should be rejected whenever it is possible for the patient to have children, and indirect ligamentopexy should take its place. All procedures in which the abdomen is not opened should be rejected because it is not possible to ascertain accurately the condition of the adnexa, nor know the reality of reduction. The operation of Dolèris is the procedure of choice in almost all cases. In a few cases it exposes the patient to danger from hemorrhage or intestinal strangulation. These cases depend on errors in indication for operation, or errors in technic. To prevent these accidents use ligamentopexy in cases of retroflexion, or painful mobility of the uterus. Do not fix too high. Make a pre-uterine fixation as large as possible. There are two anatomical dangers: wound of the epigastric artery, and destruction of the abdominal wall at the inguinal suture. The place for the passage of the round ligaments is between the two lower attachments to the right. The suprapubic transverse incision is best.

Value of the X-rays in Fibroma Uteri.—E. Lacaille (*Jour. de Med. des Enf.*, No. 12, 1914) bases his encouragement in the treatment of fibroma uteri on fourteen cases recently successfully treated by x-rays. He believes that whenever we have a case of fibroid, simple, not too large and not troublesome by reason of hemorrhages or a bad general condition, we should give the patient the benefit of the x-rays before operation is undertaken. We shall be able to lessen the pain and hemorrhage, reduce the size of the tumor, and improve the general condition of the patient. The artificial menopause will be no worse than the natural one.

Bacteriological Study of Nontuberculous Diseases of the Bladder and Kidney.—V. C. David (*Surg. Gyn. and Obst.*, 1914., xviii, 432) presents a study of the bacteriology of fifty cases of nontuberculous renal and vesical infection. He calls attention to the varying morphological and cultural characteristics of *B. coli* and allied organisms, and staphylococci found in infections of the bladder and kidney. Anaërobic organisms were present in 20 per cent. of the cases examined in which a growth was obtained, and occurred four times in pure culture. Anaërobic organisms are described as follows: A very fine gram-negative bacillus growing only on blood media; a gram-negative pigment-producing bacillus, and associated with it

a gram-negative coccus, corresponding to no known described type; funduliformis; staphylococcus parvulus; and gram-positive staphylococci.

Urinary Incontinence in Women.—H. A. Kelly and W. M. Dumm, (*Surg. Gyn. and Obst.*, 1914, xviii, 444) state that there is a type of urinary incontinence in women, with no manifest injury to the bladder, which is due to an impairment of the function of the sphincter muscle at the internal orifice of the urethra. It is most common among multiparæ in the fourth decade. The operation as performed by Kelly is the most satisfactory thus far suggested for this type of incontinence. Entire control is given in a large percentage of cases by means of a mechanical restoration of the sphincter area at the vesical neck. Operation may be under local or general anesthesia. The technic of this operation is described.

Treatment of Fibroids by Deep Röntgenotherapy.—J. J. Levy (*N. Y. State Jour. Med.*, 1914, xiv, 193) says that pedunculated submucous fibroids and those undergoing malignant degeneration are surgical cases and, therefore, they should not be treated with x-rays. X-ray therapy is perfectly safe and is without danger, provided we select our cases and the proper technic is employed. Seventy-five per cent. of fibroids can be treated successfully by deep Röntgenotherapy. Deep or intensive Röntgenotherapy means: 1. The use of a very hard tube. The rays from a coil are better suited for our purpose than those of a transformer. The hard rays are very penetrating and we employ them exclusively in gynecological conditions. 2. The tube should be near the part to be treated. The anticathode should not be further distant than 20 cm. 3. The use of a thick filter. Three millimeters of aluminum is the best filter. Filters make x-ray therapy perfectly safe, as the soft rays which only irritate the skin, are filtered off, while the deep, penetrating hard rays are the only rays that can pass through the filter. 4. Cross-fire technic. Instead of having one point of entry for the rays we can have as many as twenty or more, but for the average case we utilize only six points of entry. The lower part of the abdomen is marked off into six areas and each area is given a full Sabouraud dose. This constitutes one series. This procedure is repeated every two weeks until five series have been given, or in all thirty full Sabouraud doses. The treatment is started just after the menstrual period. After the third series, improvement is very marked, and after the fifth series, a cure generally results. It is essential that the Sabouraud pastille be placed 2 cm. from the tube and under a 3-mm. aluminum filter, the same thickness that is used for covering the abdomen. Kienbock's quantimeter is also a very scientific method to measure the amount of radiance administered. A standardized photographic paper is used and after development it is matched with a standard scale. We should always use the Sabouraud pastille and Keinbock's quantimeter in therapeutic work as it is extremely essential to be accurate in dosage.

Physiology and Pathology of Uterine Hemorrhage.—H. B. Whitehouse (*Lancet*, Mar. 28, and Apr. 4, 1914) closes a Hunterian lecture on

this subject with a discussion of the treatment of pathological uterine hemorrhage based upon the principles which he has brought out. He says that the value of curettage in the therapeutics of uterine hemorrhage is principally for diagnostic purposes. If the examination of the curetted endometrium is taken in conjunction with an analysis of the menstrual discharge, and care taken to correlate the appearances of the endometrium with the period of the sexual cycle, much valuable information may be gained as to the cause of a specific hemorrhage. Curettage at the two extremes of sexual life is a useless procedure except for diagnostic purposes. It is not possible to alter the character of the endometrium by any amount of curetting. This is proved by examination of repeated curettings from the same uterus, and it accounts for the fact that in glandular hyperplasia of the endometrium curettage is only of temporary benefit. Treatment to be successful must be based upon a physiological and pathological basis. Thus, where hemorrhage is due to the absence of thrombokinase, such as occurs in menorrhagia due to the atrophy of old age, attempts may be made to replace the same. In the case of puberty natural cure usually takes place within a few months by development of the endometrium, and in the great majority of patients there is no necessity for local treatment. At the menopause, however, if hemorrhage is very profuse or prolonged, the application of thrombokinase in the form of extract of endometrium or extract of testicle is useful in immediately controlling the same. Fibrin ferment directly applied to the endometrium is also of service in directly checking hemorrhages of this nature. If bleeding is due to excessive thrombolysis, the result of hyperplasia of the endometrium, temporary relief may be obtained by curetting. If bleeding recurs, partial oöphorectomy be performed. Where hemorrhage appears to be the result of venous stasis appropriate means must be taken to relieve the same, either by purgation in the case of portal congestion or operation where the cause is severe and chronic inflammation. In those cases where the uterus has lost its power of regulating the supply of blood to the endometrium, such as in fibrosis or arteriosclerosis, hysterectomy appears to be the safest and best method of treatment.

Uncontrollable Uterine Hemorrhage.—H. Briggs and R. A. Hendry, (*Jour. Obst. and Gyn. Brit. Emp.*, 1914, xxv, 113) present a pathological study of 101 out of 104 bleeding uteri which were removed by hysterectomy. The histological examination covered the musculature, fibrous tissue, elastic tissue, blood-vessels, and evidences of infection. From the negative findings in those they deduce the opinion that uncontrollable uterine hemorrhage is a functional disturbance. The disturbers, local and general, are numerous and varied. Among them arteriosclerosis, fibrosis uteri, chronic metritis, and chronic infective endometritis have been appraised too highly and too widely within the fields of gynecological pathology and treatment.

ITEM.

The International Society for Sexual Research (President Geh. Reg. Rat Prof. Dr. Julius Wolf, Berlin) is at present organizing its first Congress, to be held in Berlin on October 31, November 1 and 2, 1914.

The Congress will cover the entire field of scientific sexual research, and will probably be divided into a biological, medical, a sociological, a legal (including criminal anthropology and psychology), and a philosophic, psychological and pedagogical section. The proceedings will be conducted in German, English and French, the president being further empowered in special cases to permit the use of other languages.

Of the addresses so far reported may be mentioned:

Prof. Dr. Broman, Lund: "Causes and Spread of Natural Sterility and its share in the decreasing Birth-rate."

Geh. Med. Rat Prof. Dr. Fritsch, Berlin: "Subject to be announced later."

Prof. Dr. Hans Gross, Graz: "Comparative Criminal Psychology of the Sexes."

Prof. Dr. Ch. Klumker, Frankfurt, a. M. u. Pastor Wilhelm Pfeiffer: "What is to become of the World's Illegitimate Children?"

Prof. Dr. Mingazzini, Rom: "Female Criminality and Menses."

Prof. Dr. W. Mittermaier, Giessen: "The Attitude of Criminal Law to Sexual Crimes in the Course of History."

Dr. Albert Moll: "On the Psychology, Biology and Sociological Place of the Old Maid."

Prof. Dr. Sellheim: "Propagation and Readiness to Propagate as the Task of Woman."

Prof. Dr. E. Steinach, Wien: "Receptivity to Influence of the Sexual Characteristics."

Prof. Dr. S. Steinmetz Amsterdam: "The Individual Factor in Race-blending."

Geh. Reg. Rat Prof. Dr. Julius Wolf, Berlin: "Sexual Science as a Science of Education and Civilization."

Participation in the Congress is free to members of the Society. Nonmembers are expected to pay a registration fee of 10. Marks. The Second-Secretary, Dr. Max Marcuse, Berlin W. 35, Lützowstr. 85, should be informed at once of expected attendance at the Congress, either as lecturer or listener. All inquiries respecting the Congress and the Society should likewise be directed to Dr. Marcuse.

DEPARTMENT OF PEDIATRICS.

ORIGINAL COMMUNICATIONS.

VESICOVAGINAL FISTULA IN CHILD EIGHT YEARS OLD: SPONTANEOUS CURE FOLLOWING REMOVAL OF HAIRPIN.

BY

I. C. RUBIN, M. D.,

New York City.

THE introduction of foreign bodies into the vagina is not an uncommon practice among children. The motive for such practice is obvious. Yet it is not always easy to establish whether the child herself is guilty of the act or whether the latter is performed by another person, child or adult. The children are either too young to bear witness to the act or being of an understanding age often maintain unalterable silence.

The following case is interesting from a number of viewpoints:

Sarah L., eight years old, came to the special clinic for vaginitis of children at the Mount Sinai Hospital Dispensary (August 26, 1913). Her mother reported that for the past three years the child was unable to hold her urine, that she had constant discharge of "leucorrhea" and also soreness and swelling of the vulva. She had been treated at various clinics, had had various local treatments and for the past year received the benefit of a course of vaccine treatment because it was thought she was suffering from gonorrheal vulvovaginitis. The symptoms had, however, persisted.

Local examination revealed a rather precocious but somewhat scattered growth of long pubic hair. The vulvæ were very prominent, deeply injected and showed a pustular eruption. The right labium major was especially indurated. The child also had considerable disability in walking. There was marked tenderness over the right pubic bone and the condition was suggestive of a low-grade chronic periostitis. The introitus was deeply injected and was bathed with a granular discharge which had a slight urinous odor. The urethra did not show any special injection. The hymen was indurated and practically closed. In view of the chronic vaginal discharge it was deemed advisable to inspect the vagina and the cervix uteri and to note the extent of the inflammation. For this purpose the electric-lighted female urethroscope employed by us in the

examination and treatment of gonorrheal vulvovaginitis of children was here used.*

Considerable difficulty was, however, encountered in the first attempt to introduce the instrument. The latter entered about one-fourth of an inch and there met an impassable obstruction.

A sense of grating elicited by contact with the metallic tube suggested the presence of a foreign body. On introducing the light into the tube I saw the two shafts of a rusty hairpin. The length of these could not be further ascertained. Under gas and nitrous-oxide anesthesia kindly given by Dr. E. D. Oppenheimer I was able to dilate the hymen and remove the hairpin. The latter was of the ordinary size, 2 1/2 inches in length, its thickness being appreciably increased by a firm deposit of urinary salts.

The vagina contained a copious amount of a watery, granular discharge of urinous odor. After wiping the entire canal as dry as possible I applied 10 per cent. silver nitrate solution to the entire length of the vagina. A smear taken from the discharge proved to be negative for gonococci.

I saw the child four days later. The condition was improved. The swelling of the right labium majus seemed lessened. The discharge was clearer. With the electric-lighted urethroscope I saw that the vagina was practically filled with watery secretion. This was wiped away while the instrument was withdrawn. A few minutes later with the instrument reinserted, the vagina was again bathed with fluid. The points of leakage from the bladder were seen to be located on either side of the anterior vaginal wall about one and one-quarter of an inch from the introitus. They were marked by tongue-like projections that acted in ball-valve-like fashion. These fistulous openings were further identified through the administration of a half grain of methylene blue three times daily for two days. The characteristic greenish-blue fluid was then seen to trickle through. Another vaginal smear taken at this time also proved to be negative for gonococci.

The subsequent treatment consisted of urotropin gr. 5, t. i. d., internally; local application of 50 per cent. silver nitrate to the fistulous area and 10 per cent. silver nitrate solution to the rest of the vagina. Ten days following the removal of the hairpin the amount of discharge was decidedly diminished. Three days later the child's drawers remained unsoiled (for the first time in three years) according to the mother's statement, and the infiltration of the right labium was considerably less. Three days later, or sixteen days following the removal of the hairpin, the vagina was clean; the hypertrophied tabs of vaginal mucosa around the fistula had shrunk considerably. No further leakage was observed. The child continued to be able to retain her urine while the discharge from the vagina ceased permanently.

On inspection of the vagina four months after the removal of

*I. C. Rubin and J. S. Leopold. On the cause of the persistence of gonorrheal vulvovaginitis in children. *The American Journal of Diseases of Children*, January, 1913.

the hairpin the region of the fistula was flat and replaced by scar tissue. The vulva resumed a natural appearance. The vagina contained the very slight amount of secretion found in healthy children.

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UNUSUAL CASE OF CONGENITAL DEFECT; ABSENCE OF EYEBALLS.

BY

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EARLY in 1907 I delivered a strong, healthy young primipara, after an easy normal labor, of a large, vigorous boy. The position was R. O. A. and as his face was away from me, I only noticed that he was large and strong. The head was then of normal shape, not much molded.

But at the nurse's call, I went to the child. It looked like any new-born except that there were no eyeballs. Brows, lids with long lashes, easily separated, the bony sockets seeming normal and in fact the entire face perfect.

Never having heard nor read of such a case, next day I had a prominent oculist of wide experience see the infant. He also had never seen the like. I reported the case to the Douglas County Medical Society with the same result. No book on obstetrics, pediatrics, nor even a large work on monstrosities, so much as mentioned the possibility of such a condition.

Realizing then that this was an extremely unusual case I wrote to Prof. J. Whitridge Williams of Johns Hopkins University. He expressed much interest in the case, said he had never seen the like, but that the condition was mentioned in Schwalbe's work on Teratology.

For several months the child developed normally, but passing from my immediate observation, the mother weaned it from the breast, and condensed milk soon caused rickets. As she had been warned by me against this, she went to another physician, only to find his opinion of such diet was just like mine. Under proper food and care the boy improved and when I next saw him, the effects of rickets were not very evident.

When he was nearly two years old, the mother entered the hospital for her second confinement, and this unfortunate one was

also admitted. He could not yet walk, but this was thought due to his blindness and to neglect of efforts to teach him.

But by this time his head was of a most extraordinary shape. The anteroposterior diameter was very long, the height of the cranial vault was at least normal but the sides of the head over the lower parietals and the squamous portion of the temporals were as if the head had been squeezed, so that the transverse diameter here was much decreased. In a word the head was of exaggerated scaphoid shape. It was evident that part of the middle cerebral lobes must be affected. Also the child was certainly mentally defective.

Up to December, 1913, I heard from him at rare intervals. Then the mother came to Omaha, and calling at my office, told me he was still living, and at the Home for Feeble Minded at Glenwood, Ia.

On my request, the Superintendent, Dr. Mogridge, furnished the following information as to his mental and physical condition. He said: "In regard to his mental condition, he is in the neighborhood of three years old mentally, and according to the Binet-Simon classification, this would make him a 'low grade-imbecile.' He is able to walk, but usually does not do so unless assisted. I suppose this is due to the fact of his being blind. He is also able to use his hands to a certain extent. He is usually quite happy and will hum little tunes, but if he is touched by anyone whom he does not know, he is easily irritated. He weighs between thirty-three and thirty-five pounds."

As can be seen from Dr. Mogridges' account, the size of this child is fair for his age, about seven years. He says nothing about his powers of speech, but the mother told me that he says a few words.

I purposely delayed reporting this most unusual and interesting case till he had attained the age of boyhood. An examination of his brain certainly would be interesting. It seems likely the entire tracts concerned with visual impressions must be atrophied if not practically absent.

It must be of interest to note that the first thing the mother inquired about after his birth was his eyes. Having been told that she had very bad eyes in infancy (ophthalmia neonatorum), she had been constantly worrying lest the child's eyes should be wrong.

TRANSACTIONS OF THE NEW YORK ACADEMY OF MEDICINE.

SECTION ON PEDIATRICS.

Stated Meeting, Held April 9, 1914.

DR. WILLIAM P. NORTHRUP *in the Chair.*

BLUE SCLERA ASSOCIATED WITH FRAGILITY OF THE BONES.

DR. CHARLES HERRMAN presented a child twenty months old with blue sclera associated with fragility of the bones. The parents of the patient were healthy and had three other healthy children who began to walk and talk at the proper age. The patient was nursed for ten months, had digestive trouble occasionally and was always delicate. The first teeth appeared at seven months. The patient was able to sit up at nine months but has never been able to stand alone or to talk. In December, 1913, the child fell from a chair and fractured the right tibia. About six weeks later while in bed, the cast still applied, the child fractured the right femur. On examination the child shows a skull with a short anteroposterior diameter and prominent brow. The sclera are distinctly blue. Not of a bluish tinge such as is frequently seen in tuberculous patients, but what is known as a pale china blue. There are no marked signs of rickets. The fontanel is closed, the child has twelve teeth, no rosary or enlargement of the epiphyses. The occurrence of blue sclera in certain patients has been noted by several English ophthalmologists, Adair-Dighton, Stephenson and others. The sclera are distinctly blue and the color is uniform throughout. Bluish patches in the sclera I have noted in a number of colored children. The English observers have reported families in which several generations showed this peculiarity. It is usually transmitted through its female members. Not all the members of the family have blue sclera and not all who have blue sclera have fragile bones; but all those who have fragile bones have blue sclera. A somewhat similar sclera is occasionally seen in congenital heart disease and may be due to a similar cause, namely a lack of fibrous tissue allowing the choroid to show through the thin sclera. The fragility and lack of elasticity in the bones is probably due to a similar change in structure. As far as I know no pathological examination of the sclera and bones in these cases has been made. In my own patient the radiographic examinations were made while the leg was still in the cast so that the minute structure of the bones is not shown. Now that the cast has been removed I shall have another radiographic examination made and shall present the plates at a future meeting. An interesting question is what relation do these cases

bear to those of "Osteogenesis imperfecta" or "Fragilitas ossium." They appear to bear some relation to the late cases of the latter disease. However, the condition is rare and only recently described. Without careful radiological and pathological examinations this point cannot be definitely decided.

THE ETIOLOGY OF PERTUSSIS.

DR. ANNA WESSELS WILLIAMS announced that they were still only able to report that they were nearing the time when they could fully demonstrate the specific etiological factor in whooping cough. They were continuing to add evidence but this did not yet amount to proof.

For complete proof of a specific cause of pertussis the demonstration of the same microorganism in every case of whooping cough was lacking. The bacillus described by Bordet and Gengou had been reported by most observers as more frequently present than any other organism except those belonging to the influenza group in the narrow sense, that was to the group of hemoglobinophilic bacilli. Many of these reports were based upon morphological findings in direct stained spreads, and by the microscopic method alone it was not possible in many cases to differentiate between the Bordet-Gengou bacillus and a large number of minute gram-positive morphologically similar bacilli (chiefly of the influenza type) which were found in the respiratory tract of human beings, particularly in the latter stages of the inflammatory process. Very few of the cases had been examined from the beginning of the disease to the end, and furthermore very few cases died in the early stages of the disease so that autopsy findings were complicated by these mixed infections which seemed to be the direct cause of death in the majority of cases. Probably no case of pertussis was uncomplicated from the beginning to the end. In order to determine the presence of specific organism in infection in this locality one should be able to study the cases from the beginning to the end under favorable conditions for isolation and observation; cases occurring in well-to-do and intelligent families were better suited for this purpose than those occurring in poor overcrowded homes, or in institutions and hospitals. The practising physician should give his help in obtaining these favorable cases. The ideal place for the study was a special hospital where the children could be treated and studied with sufficient controls. Their studies had emphasized the truth of these observations. Most of the cases in which they had obtained an abundant and almost pure culture of a bacillus answering the description of the Bordet-Gengou had occurred in homes of the better class of people and were examined early in the disease. The Bordet-Gengou bacillus was easily overgrown by other bacteria, and so, unless present in great numbers it was difficult to isolate.

The majority of strains which they had isolated had been shown to be a species distinct from the hemoglobinophilic bacilli and from certain other bacilli morphologically similar to the Bordet-Gengou

bacillus. Not only were later cultural characteristics different, but these strains produced specific antibodies in experimental animals which gave a positive result with the complement fixation test. They had obtained strains from several cases that were not typically like those which they called the Bordet-Gengou bacillus and they were now making minute cross fixation tests in order to determine the important question of varieties in this species. The evidence thus far obtained pointed to the truth of the variety hypothesis. If it proved true it could explain partly the varying results reported from the vaccine treatment and it would mean that either they must work out a suitable polyvalent vaccine, or that they must use an autogenous vaccine, at any rate in certain cases. Their finding had also pointed to the importance of mixed infections in pertussis cases, so, if further study proved the specific action of the Bordet-Gengou bacillus, or group of bacilli, the possibility of needing a mixed vaccine in certain cases must be considered unless treatment with a suitable polyvalent or autogenous vaccine given at the very beginning of the disease proved efficacious.

The complement fixation test with the serum of human beings having or having had pertussis was not as clear cut as it so far seemed to be with the serum of animals which had been artificially infected with the bacillus pertussis. Of course they could not expect it to be as marked in human beings as in hyperimmunized animals, but they might expect to find true the claim of Bordet and others that this test was positive with the serum of the great majority if not of all of the patients after the second week of the disease. Wollstein and others, however, had not obtained these uniformly positive reactions.

As to the second important lack in the proof of the specificity of a definite organism in this disease, that was, a sufficient number of cases studied completely in regard to their serum reactions at different stages of the disease with autogenous cultures and with others, they were confronted by many difficulties. Parents frequently objected to the taking of even one specimen of blood. The best method of making the complement fixation test was still under experiment. Different observers had used different methods of preparing both antigen and serum and has also employed different hemolytic systems. They had found that many of these methods did not stand the test of sufficient controls.

The third important lack was clear evidence of the specific lesion in pertussis. This question of the histological pathology of the disease had recently received a new impetus through the interesting hypothesis of Dr. Mallory, who claimed that a certain number of bacilli between the cilia of the epithelial cells in the trachea and bronchi constituted the specific lesion. He claimed that he had fulfilled Koch's law by the finding of these bacilli in experimental animals in the same situation and by the recovery of the culture from these animals. He now acknowledges that his results in animals were complicated by the fact that the animals were frequently infected by the *B. bronchisepticus* which was morphologically similar

to the pertussis bacillus and which apparently had the same power, as Theobald Smith and others had pointed out, to cling to the cilia of the epithelial cells in the respiratory tract. In human beings, Mallory stated, only pertussis cases showed this lesion. It was to be supposed that chief among the controls were cases of children dying of influenza pneumonia. These were the cases in which they were most interested as controls.

As far as the examination of autopsies were concerned they had one suggestive case in a two year old child who died in the third week of pertussis, apparently as the direct result of the disease. They had obtained from this case at the beginning of the second week of the disease a typical Bordet-Gengou bacillus from the sputum. From the autopsy material they were only able to obtain, on the Bordet-Gengou medium and other media, practically pure abundant growths of the hemoglobinophilic bacillus. Sections of the trachea and bronchi prepared according to Mallory directions showed surfaces mostly denuded of cilia. This was probably a postmortem change in this case as the autopsy was not done until forty-eight hours after death. Between the cilia remaining a few minute bacilli were seen which, from morphological possibilities, would have to be classed with the influenza bacillus. It seemed to them that the Mallory lesion would be found to be only a part, and not a strictly specific part of the whole, and that the specific toxin upon which Bordet insisted was an important aid in producing hypersensitiveness of the recurrent laryngeal nerve and its center.

From their study they concluded as follows: 1. Though the Bordet-Gengou bacillus had not been found in the majority of cases of pertussis, it had been found most frequently under the best and most significant conditions and that there were sufficient reasons for not finding it under other conditions. 2. The irregular reports given of the complement fixation tests in human beings might be accounted for by the different methods used without making comparative studies and sufficient controls, and by the occurrence of distinct varieties in the species *B. pertussis*. 3. The irregular results from vaccine treatment might be accounted for by the lack of definite group work among physicians with the establishment of a general plan and sufficient controls in each series of cases studied, at the same time taking into consideration the various points still under discussion. 4. The hypothesis of Mallory that the essential lesion of pertussis was chiefly a mechanical one could only be considered as a suggestion for further study in establishing the specificity of the Bordet-Gengou bacillus.

DISCUSSION.

DR. JOHN S. BILLINGS, representing the Commissioner of Health, said he had been requested to describe briefly what the Health Department was doing in regard to whooping cough and what they purposed doing. Dr. Williams had already described some important lines of work and he wished to speak of what they were doing in the way of sanitary supervision. Prior to the reorganization of the

Bureau of Infectious Diseases they had not been active in combating whooping cough except to require that cases be reported and that they be excluded from the schools. Cases of whooping cough were not visited. With the reorganization of the Department and the establishment of the Bureau of Infectious Diseases, sanitary supervision of whooping cough was carried out by the nurses as far as possible. The new plan had only gone into effect January 1, 1914, and the first month had been spent in breaking in the nurses. As was usual during February and March their time was all required in handling measles and scarlet fever so that they had so far had no time for visiting whooping cough cases. But as soon as possible the nurses would visit the homes of whooping cough patients. The mothers or heads of families received a card describing the dangers of whooping cough and giving the precautions that should be taken to protect others from the disease. When the paroxysmal cough was no longer present the child could be readmitted to school. A comparison of the death certificates with the cases reported showed that notification was not closely observed, but they had not been drastic in enforcing this measure. The nurses would keep the children under observation and if the regulations laid down by the Department were not observed the child would be removed to a hospital.

As was already known Dr. Goldwater had enlarged the Department of Publicity. Ten thousand copies of the Bulletin were now sent to physicians weekly and through this they hoped to get the coöperation of the profession in their efforts to control whooping cough. He hoped that they would soon have a camp hospital for whooping cough cases. They had made arrangements to use the boat of St. John's Guild, the Helen C. Juilliard, this winter and had expected to moor it off the Willard Parker Hospital, but the Minturn Hospital authorities objected fearing lest the moorings would menace the foundations of their buildings. The Middletown, a smaller boat, could be used in this way without causing trouble.

Since January 1, 1914, the Department has maintained one whooping cough clinic in Brooklyn, where during other hours a Wassermann clinic is also held. This clinic was not in a tenement district and so was not patronized to any extent. In 1913 a request was received from the Association of Out-patient Clinics for information in regard to establishing special clinics for whooping cough cases. A survey was made of the institutions and dispensaries in New York City, with the following results: Of 116 institutions there were thirty-eight to which whooping cough cases applied for treatment; seventy-eight had no such applications; of these thirty-eight, thirty-four treated cases that applied. There were two dispensaries that used vaccine and twenty-eight that employed drugs. Five institutions had physicians visit whooping cough patients in their homes. In reply to the question, "Do you report cases of whooping cough?" sixty-seven institutions said they did not report whooping cough, and forty-nine said that they did report it. In reply to the question, "Do you have special postals for this purpose?" sixty-eight insti-

tutions had no such postals while forty-eight had them. In reply to the question as to whether they wished to establish special classes for whooping cough there were no positive answers, but fifteen said that they would consider the question. Fifty-five said they did not care to have such special classes. After the requirements were explained to them 101 said that they could not comply with them, and fifteen thought that they could. An inquiry into the methods of examining applicants showed that 102 of the institutions did not make any preliminary examination of applicants. The requirements of the Health Department for special whooping cough clinics would probably be that the quarters used for this purpose should open directly on the street; that they should not be used for any other purpose; that they should be thoroughly scrubbed and cleaned after the clinic, and the windows left open during the entire time when not in use. Such clinics should be located in the tenement districts of the poorer class as it was useless to establish such a clinic unless it was within walking distance of the people who would attend it. No person having whooping cough should use a public conveyance and the same care should be exercised in handling the sputum as was employed in cases of tuberculosis.

THE CLINICAL AND SOCIOLOGICAL ASPECTS OF WHOOPING COUGH.

DR. JOHN LOVETT MORSE of Boston, Mass., said that he knew no more of the clinical aspects of whooping cough than they all knew, and if he knew more of the sociological aspects of the disease it was because he made a study of these a year ago and had collected statistics in regard to the incidence and mortality of whooping cough, which he had presented in a paper read before the American Pediatric Society in May, 1913. The mortality statistics, as compiled by the United States Census Bureau in 1906 from a registration area comprising a little less than one-half of the population of the United States showed that there were 6324 deaths from whooping cough among children under five years of age. The reports of the United States Public Health Service showed that in 1910 the death rate per 100,000 population for the common diseases of childhood were as follows: Whooping cough, 11.4 per cent.; scarlet fever, 11.6 per cent.; measles, 12.3 per cent. In 1911 the author had communicated with the boards of health of thirty states and with a considerable number of cities scattered all over the United States with reference to the relative incidence and the efforts at control of whooping cough and had received replies from sixty-one. A study and comparison of the statistics received showed that on the whole the death rate from whooping cough was greater in the large cities than in the small and greater in the small cities than in the rural districts. There were a large number of deaths from complications of whooping cough that should be added to the deaths from the disease itself. The mortality from whooping cough was greater than that from scarlet fever but not as great as from diphtheria. All the statistics showed that whooping cough was a serious and a fatal disease. Inquiries as to what was

being done to prevent the spread and diminish the death rate of whooping cough showed that surprisingly little effort was being made in these directions. In only twenty-nine of forty-three States had this question been answered. In seven States isolation was required by law and in two others "modified isolation" was required. In only one-half the States was whooping cough a notifiable disease.

In regard to the mortality of the disease at different ages a German statistician had shown the mortality of children under one year of age as 26.8 per cent.; in children between one and two years of age 23.4 per cent., and that it gradually decreased in direct proportion as the age of the child increased. In this country in 1906, 96 per cent. of the deaths from whooping cough occurred in children under five years of age. This made it evident where the efforts in the work of prevention must be directed.

It was shown that there was practically no hospital accommodation for whooping cough in this country. There was a special ward for children with whooping cough at Bellevue but only those having complications were admitted. There were also two isolation cottages at Randall's Island; Philadelphia had somewhat better accommodations; New Orleans had one ward with six beds; Cincinnati had one isolation building, and Johns Hopkins had a few beds. All general hospitals took in whooping cough with complications. Patients with whooping cough frequently came to clinics and waited for a long time among other patients, and they were allowed to come back at will by some clinics. In one clinic of which he knew, the patients with whooping cough were treated on the sidewalk. There were but two or three special clinics for whooping cough in this country.

Dr. Morse said he had been under the impression that Mallory had conclusively proved that the Bordet-Gengou bacillus was the cause of whooping cough until he had listened to Dr. Williams's paper and he still thought that for practical purposes it might be considered as such. It had been found in the sputum as late as the eighth week of the spasmodic stage and transmitted the disease through the secretions of the respiratory tract. It was possible that some animals might be infected with the disease, but transmission by this means did not play an important part and was not an element in the control of the disease. It was the transmission by direct contagion that was important. On account of the indefinite early symptoms and the mild course of the disease in many cases, almost every one sooner or later had this affection, but as a rule it was only serious in young children. The isolation and recognition of the cultures was still too complicated a procedure for every day use. An agglutination reaction was present in many cases, but was not constant and usually not very high. The complement fixation reaction might be of great service in the recognition of abortive and atypical cases in exceptional circumstances. There was an increase in the total number of white corpuscles with an absolute and relative increase in the number of lymphocytes in the catarrhal stage of the disease. This blood picture was characteristic and was therefore of considerable diagnostic importance.

The author expressed the opinion that, aside from the pediatricists and the National Public Health Service, few appreciated the fact that whooping cough was a serious and fatal disease. The first step in combating the disease was to teach physicians and the public this fact. Whooping cough must be made everywhere a reportable disease. The house should be placarded and the inmates instructed by the health authorities as to the seriousness of this disease in infancy. The sputum and vomitus should be treated in the same way as in tuberculosis. The patient should be separated from other children in the family if the latter were under five years of age. There was no reason why children should not be allowed to go out of doors provided they were kept away from other children. They should, however, be obliged to wear an arm band of some prescribed color on which was the word "Whooping Cough" in large letters. The vitality of the Bordet-Gengou bacillus outside the body being slight and the bacillus having no tolerance of light and air, formal disinfection was not necessary. Other children in the family should not be allowed to attend school unless they had already had the disease, or until two weeks had elapsed since the last exposure, and were free from catarrhal symptoms. The community should be required to establish hospitals for children not properly isolated at home and for those who could not be properly treated in their homes. When these recommendations were carried out whooping cough would cease to be the scourge that it now is.

THE TREATMENT OF PERTUSSIS.

DR. EDWIN E. GRAHAM, Philadelphia, said that the treatment of pertussis was one which had always absorbed a large degree of medical attention, and the mere enumeration of all the drugs, inhalations, and cures which had from time to time been brought forward, would consume more time than had been allotted to him. Particular attention would be drawn only to a few of the drugs and methods of treatment that have stood the test of long experience.

As pertussis was contagious from the beginning of the catarrhal stage until the end of the spasmodic stage, a period of about eight weeks, it was important that all children who had not had the disease be kept separate from the individual who had it, and in order for quarantine to be effective, all unexposed children should be sent away from the house during the entire period of contagion; this applied particularly to infants, to children who were not robust and to those who had a tendency to tuberculosis. A child with pertussis should not be allowed to attend school, and quarantine should be maintained until the end of the spasmodic stage.

All children with pertussis should be given an abundance of fresh air and should be kept in bed if their temperature was 100° F. or higher. If the patient was sufficiently ill to be in bed the windows should be open day and night, if not in bed the child should spend as much time as possible out of doors. However, excitement and violent exercise tended to increase the attacks. An acute laryngitis or

rhinitis was, however, not benefited by cold air; for such cases the air in the sick room must be kept fresh but not cold. A change of air, especially to the seashore, was often of benefit and a change from a raw damp climate to a warmer and milder one was often followed by improvement. If the child had been confined to bed for any considerable time it was an advantage to remove him to another room and thoroughly house-clean the room before returning him to it. Many cases of whooping cough in hospitals suffered from a mixed infection, and at least a temporary benefit would follow their removal to a recently cleaned and fumigated ward. All children with pertussis should be fed in small quantities and often; if a child vomited soon after the ingestion of nourishment, it should be given another feeding to replace the one vomited. Gastrointestinal disorders in young children suffering from pertussis often constituted a dangerous complication and should receive early and careful dietetic and medicinal treatment.

Local applications to the nasopharynx, if made during the first two weeks of the disease, might be of decided value. They were of assistance only when the infection was localized in the upper air passages. An application of a 2 per cent. nitrate of silver solution applied to the nasopharynx, by producing death of the superficial membrane, and possibly destroying some of the specific pertussis bacilli, tended to prevent the spread of the infection to the deeper respiratory passages. Phenol, 1 per cent., had also been used successfully as a local application. It should be used early and might be repeated every second day.

Various drugs had been used by inhalation, among which were creosote and carbolic acid. They might be used in the ordinary inhaler covering the nose and mouth or by vapor in the room of the patient. They acted as a sedative to the inflamed mucous membrane and as a local antiseptic in some degree. As children were especially susceptible to carbolic acid poisoning the urine must be watched closely. Chloroform might also be given cautiously by the physician when the paroxysms were especially severe and frequent. When the spasm of the glottis was especially severe intubation might be done and often gave relief.

The medicinal treatment of pertussis might be divided for convenience into two parts: First, drugs or other methods which *per se* had a tendency to lessen the number and severity of the paroxysms. Second, drugs or other methods that were directed to the treatment of the complications of pertussis. Among the drugs that were useful in pertussis must be mentioned belladonna. The author used the tincture, beginning with one drop three times a day and increasing the daily quantity by one or two drops until mild physiological effects of the drug appeared, when the increasing of the dose must be cautiously continued. Antipyrin was a useful drug, but personally, he never used it in the frequent doses so often advised. A single dose at bed time or a morning and evening dose was as much as in his opinion, it was wise to employ. Bromide of soda, five grains, three or four times a day, to a child of three years was often of benefit, and

codein, trional, heroin and chloral were often of benefit in allaying cough and inducing sleep. They might be given in a single dose at bed time, or, if necessary, two or three times a day. A combination of quinine, two parts, veronal, one part, had been used successfully by Professor Winternitz of Vienna. He claimed improvement in twenty-six out of thirty children in whom he had used the combined drugs, but believed that it only acted as long as given, and was not a cure. Fraenkel and Hauptmann also advised this combination of veronal and quinine. They did not advise its use in children under six months of age. Sollman and Hatcher reported favorable results from a combination of quinine, one or two grains, and bromide, one or two grains, repeated three or four times a day for a child two years of age. Quinine had been given in large doses and might reduce not only the number but the severity of the paroxysms. It was not an anti-spasmodic, and if it produced any effect in these large doses it must be due to some effect on the causal bacillus. Lenzmann had reported some interesting results from the giving of quinine intravenously and hypodermically. He secured very prompt and positive results from doses of five grains injected intravenously every second day. Quinine lactate, 10 grams, and saline solution, 100 grams, of which 2 1/2 c.c. warm was injected intravenously, might be similarly used. If given hypodermically into the muscles the effect was favorable, but not as prompt nor as satisfactory as when given intravenously. Hydroquinine had been employed both intravenously and intramuscularly but its action was more favorable when injected into the vein. It came in ampoules, the dose being proportioned to the age of the child. A daily dose was given for five or six days, then a dose every second day, and it was claimed that a marked improvement was noted after the first week of treatment. No disagreeable local or constitutional symptoms followed after these injections and so much was claimed for this treatment that it was worthy of more extended trials. Hydroquinine had been used both intravenously and intramuscularly as a prophylactic with satisfactory results. Adrenalin had been strongly advised in the treatment of pertussis by Fletcher, and others had reported favorable results following its use. He treated 15 cases, giving two or three drops of 1-1000 adrenalin solution every two or three hours, and claimed that in two or three weeks the patients were entirely well. He believed that the rapid cure of these cases prevented the spread of pertussis and that the adrenalin exerted a specific action on the causal agent of pertussis.

Every close student of pertussis must have been impressed with the psychic element that so often entered into the disease, especially in neurotic children. If the mother and those who were brought in contact with the nervous child were also neurotic, all the conditions were favorable for the development of marked psychic phenomena. It was quite possible in such cases to use suggestion advantageously as an aid in the treatment.

The writer related two cases which illustrated the necessity of a correct diagnosis of complications in pertussis. The first was a boy

of 13 months with a tuberculous family history and himself tuberculous. He passed successfully through a severe attack of pertussis complicated with bronchopneumonia. In the stage of decline he became more and more drowsy and a clear fluid was removed by lumbar puncture in which the tubercle bacilli could not be found and a guinea-pig injected with three c.c. of the fluid failed to develop tuberculosis. There had never been any discharge from the ears but a drop or two of fluid was obtained by swabbing the ear and pus was obtained from both ears by puncturing the drums; the day following a double mastoid operation disclosed a well-advanced double mastoiditis with secondary otitic meningitis. Another case of interest was that of the seven year old son of a physician, who, during an attack of pertussis, had an unusually severe paroxysm on February 15. The next morning he had fever and vomiting. His vision continued to decline until March 13 when it was found to be: left 11/200; right, 20/200. The discs were pale; the retinal arteries reduced in size, and the field of view concentrically contracted. There had been a high-grade double optic neuritis; at present, there was total secondary atrophy, disseminated choroiditis of both eyes and divergence. The vision was reduced to light perception. Under ethyl-chloride narcosis, the pupils contracted ad maximum. The diagnosis was hemorrhage into the sheath of the nerve at the optic chiasm.

In regard to the vaccine treatment, a large number of articles had appeared on this subject and a close study of these as well as of his own cases had convinced Dr. Graham that the vaccines were a distinct addition to their methods of treatment; they were also of more or less use as a prophylactic. In a case of moderate severity in an infant or an older child, when the number of paroxysms was few and of mild character, the vaccine treatment was not necessary, but it was often of distinct benefit in severe cases, in children of all ages, and its influence as a prophylactic, where infants had been exposed, or where frail or tuberculous children had been infected, should be carefully worked out.

Dr. Graham reviewed the reports of Dr. E. M. Sill, Dr. Freeman of London, Dr. Charles Nicolle and Dr. A. Connor, Dr. Lagane, and Professor Manaticide on the vaccine treatment of pertussis and concluded that almost all of them were favorable to the treatment, and it seemed to him advisable to use the combined vaccines in the treatment of severe cases of pertussis. The final verdict as to their efficiency could only be decided by additional evidence.

THE NEED OF HOSPITALS FOR WHOOPING COUGH IN NEW YORK CITY.

DR. GODFREY R. PISEK said that New York City might well be proud of its mortality record, particularly as it applied to children under five years of age. If the investigation which had just been made of our municipal institutions had been extended to the accommodations which they had provided for cases of pertussis, the survey

would not have consumed much time. Our municipality was no better, and not much worse, than any of the other great centers of world in the regulations and care provided for patients with the whooping cough.

Pertussis, mainly through its commonest complication, bronchopneumonia, carried away a large number of the children of New York every year. There were in the year 1913 a total of 420 deaths of children from whooping cough in the Greater City. Of these 49.5 per cent. occurred in the first year of life; 33.4 per cent. between one and two years of age; 8.8 per cent. between two and three years; 5.2 per cent. between three and four years; 1.9 per cent. between four and five years, and 1.2 per cent. in children over five years. It was a well known and deplorable fact that many children succumbed to tuberculosis following their paroxysmal attacks. The incidence of whooping cough and the mortality in Greater New York since 1910 was as follows: In 1910 there were 2018 cases with 294 deaths; in 1911, 3210 cases with 384 deaths; in 1912, 2132 cases with 287 deaths, and in 1913, 3529 cases, with 420 deaths. Compared with the deaths from other diseases of childhood there were, in 1913, 1333 deaths from diphtheria, 628 from measles, 507 from scarlet fever and 420 from whooping cough. In children under the age of five years there were more who were attacked with whooping cough than with scarlet fever. While there were 415 children under five years of age who had whooping cough in the year 1913, there were only twelve who had typhoid fever. There was ample hospital provision for typhoid fever and yet the mortality from pertussis was far greater than that of typhoid fever.

For diphtheria, scarlet fever, and just recently for measles, hospital facilities had been provided, but for a disease which demanded a toll almost equal to that of scarlet fever practically no provision had been made. There were in New York City 1884 available beds for infants and children in the public and semi-private hospitals and 2350 beds in the various hospitals for contagious diseases. At the present time there were set apart ten beds in Bellevue for complicated cases of pertussis and thirty beds at the Metropolitan Hospital on Blackwell's Island.

If whooping cough had only been born with some kind of a rash it would not now need any advocates to point out the dangers with which it was attended. As it was the laity regarded it as not particularly dangerous and physicians often fostered this idea or expressed their hopelessness in the face of it, so that comparatively little medical attention was given it until the patient had serious and often fatal complications. Believing that only a comparatively small number of cases of pertussis reached the physician and that by no means all of these were reported by him, the deaths ascribed to whooping cough during the last six months were tabulated. They made an investigation as to the number of these actually reported and found that only one in sixty-three had been previously reported to the Department, that three were reported by school nurses, and that one was sent in on the day of death. The figures of the

Department of Child Hygiene, relating to contagious diseases reported by the inspectors in the schools or found at home were interesting in this connection. In 1912, 372 cases of whooping cough were found at school and 466 by absentee visits, or a total of 838. In 1913, 291 were found at school and 445 by absentee visits, or a total of 736 cases. The health authorities have required that the disease be reported and the child excluded from school, but further than that they had not acted. The reason for this lay in certain difficulties that differentiated this disease widely from the other contagious diseases. The comparatively long first stage in which the diagnosis was often uncertain for days, and the long duration and questionable period of "safety for others" made the disease difficult to handle from the health board standpoint.

In attempting to formulate any plan for control we must recognize the valid objections to general hospital care, but there still remained much to be said in favor of the hospital care of cases with complications or segregation of those affected.

Among our large population there were constantly appearing cases of whooping cough in families who were unable to provide medical care for them because of poverty. They were compelled to go to the dispensaries. From these, after having waited and mingled with other children, they were singled out as pariahs and sent home, often untreated because of lack of suitable provisions and with no instructions as to the care and prevention of the spread of the disease. Where the mother was the breadwinner, the child not being admitted to a day nursery or a hospital, she was obliged to abandon her livelihood and thus from an economic standpoint we were obliged to consider adequate provision and control of this disease. Likewise an infant with bronchopneumonia, whose needs were judicious stimulation, skilled nursing, and abundance of fresh air, was deprived of these and allowed to die in its tenement house for lack of municipal facilities. Besides these urgent needs for the care of patients with whooping cough there is a dearth of measures for prevention. Constructive recommendations must be practical, enforceable and economically possible. If an intensive study of the disease were made in a selected section of the city it seemed certain that many more cases of whooping cough would come to light than were ever reported, and on a more accurate basis the need of hospital beds could then be apportioned, and the public notified that the city was ready to care for those who were in need. At the present time there were no suitable available buildings. These should be built on the open pavilion plan near the water fronts, and especially designed for this purpose; at least one for each borough. For the great number of uncomplicated cases who went about spreading the disease, disused ferry boats or barges moored to the city docks could be utilized; on these a small hospital ward should be arranged for those needing medical attention and feeding. Dispensaries for ambulant cases of whooping cough could be held here, and cases could be referred here from other clinics. Children with their mothers could be taken in stages provided by the city to these boats and allowed to spend

the day outdoors, returning to their homes at night. With such a plan a large number could be educated to follow proper methods of prevention; well children could be spared contact, and deaths from complicating conditions prevented. That the disease was very prevalent in this section was shown by Dr. Pisek's own case histories, the last 500 of which, under 10 years of age, showed 45.8 per cent. to have had whooping cough.

There could be little question but that provision for whooping cough cases would promote the public welfare and moreover would give physicians an opportunity to study the disease as to its early diagnosis, and to perfect the treatment along more scientific lines, now that the specific organism was known.

To this end the writer recommended that a committee from the members of this Section should be appointed who should present to the Commissioner of Health a recommendation urging the establishment of wards for urgent cases of pertussis, and segregation centers for uncomplicated cases.

DISCUSSION OF SYMPOSIUM ON WHOOPING COUGH.

DR. JOHN WINTERS BRANNAN said that in regard to the accommodations for whooping cough patients Bellevue had ten beds; they were intended for cases with complications such as otitis, pneumonia, etc. The Metropolitan Hospital made provision for a few cases. The meeting this evening was one of the most important from the standpoint of public health that they had had for years. He had not realized that conditions were as bad as they had been shown to be. However, they had a Commissioner of Health who would carry out their suggestions—by this statement he did not mean that the former Commissioner would not have done the same had the suggestion been made—and something would be done to remedy the present conditions with reference to this disease. It was to be regretted that the boat could not have been moored off Willard Parker Hospital. Later in the winter they found that it would have been possible to have placed it there. He hoped, however, that they would have a boat next year. There were few places around Manhattan that were suitable for a whooping cough boat as it was necessary to have such a boat near a hospital in order to obtain heat, light and food supplies.

DR. ROWLAND G. FREEMAN said that they were greatly indebted to Dr. Morse and Dr. Graham for their valuable contributions. Concerning what Dr. Morse had said in regard to the spread of whooping cough he would like to emphasize the point that it is difficult to limit its spread because during the first two weeks it is often impossible to make a definite diagnosis. Two points, however, were of great value; these were a persistent increasing cough without other catarrhal symptoms and a high lymphocytosis. If a child over three years with a suspicious cough shows a lymphocytosis approaching 50 per cent. the diagnosis was fairly certain.

While infant mortality and general mortality had markedly diminished in recent years contagious diseases showed little diminution.

This is because these diseases are largely spread by the schools and no effective action has been taken to prevent their spread. This can only be prevented by keeping children who have been thoroughly exposed to contagious disease away from school during the latter part of the period of incubation, and such rules are now in force in the best private schools of New York.

DR. CHARLES GILMORE KERLEY stated that the mortality statistics as given for whooping cough did not give a proper impression of the extent of the ravages of that disease as it played an important part in diminishing the resistance of the child and thus lessening its chances of surviving the diarrheal diseases of summer. The same was true with reference to tuberculosis; with the diminished resistance following whooping cough the child more readily fell a victim to this affection.

As to isolation, if the child was taken out of school it went into the street and there mingled with other children. With reference to isolation in the family, by the time a diagnosis of whooping cough was made every other child in the family had been exposed, and so from the point of view of the family isolation was of no account. Mild cases were very difficult to diagnose and there was at present an epidemic of these mild cases in the city.

What had been said in regard to changing the room of the whooping cough patient was correct; it was a great advantage for the child to have a different room to sleep in from the one it occupied during the day.

With regard to the statement that the cases treated by the local application of nitrate of silver all improved after three or four weeks; any case would be better by that time. He had found quinine alternated with bromide of sodium and antipyrine very acceptable.

In an interview with Dr. John Freeman last summer he had found that Dr. Freeman was not so enthusiastic in regard to the vaccine treatment of whooping cough as his statistics given by Dr. Graham would lead one to suppose. Dr. Kerley said he had asked Dr. Freeman if he would give the vaccines to his own children, and he replied that he had done so. As to the results he said the nurse girl thought they did some good but he was not so sure. Dr. Freeman said that the vaccines did no harm and the usual dose was two hundred million twice a week. He had used the pneumococcus vaccine with these and thought this was an advantage in preventing pneumonia.

DR. MATTHIAS NICOLL, JR., recalled a statement of the Chairman, Dr. Northrup, to the effect that "anything that one did for whooping cough had some good effect but that nothing cured it." In regard to the value of vaccine treatment, he had read all the reports on the subject but had never seen one in which an analysis of the case records as given convinced him of the great value of the remedy, although many of the writers draw favorable conclusions hardly warranted by the statistics.

From what Dr. Williams had said of the probably variable nature of the infecting organism, it was logical to expect variable results

with employment of a stock vaccine. Very great differences in the clinical course of the disease as well as the character of prevailing epidemics made the reports of a few cases of little value as a means of judging the specific action of a remedy, especially if controls were not used in practically every case. As an example: A young child, ill with whooping cough for ten days or more, and having had three or four convulsions daily for a week, was treated with vaccines. Another child in the same ward having the disease for about the same length of time but not so severely, was not treated. As a result the convulsions in the first child ceased after the first injection of vaccine and the number of paroxysms diminished in number and severity, after which in spite of repeated doses of vaccine they remained about the same for a number of weeks, the child in the meanwhile rapidly gaining flesh and strength. The control case showed practically the same clinical course in regard to the number and severity of the paroxysms as well as their duration in days. It is probable that in this instance, the vaccine treatment was helpful but not beyond the possibility of dispute.

In the last analysis the strictest test of the value of a specific remedy must be its power to prevent a disease and a vaccine that cannot do this can hardly be expected to overcome a disease when once established. A small number of cases have been reported in which such a protective action seems to have been established. However, the number of such instances are by no means sufficiently large to warrant positive conclusions, for it must be remembered that all children do not take the disease even when very fully exposed to it. As an example: Dr. Nicoll had gone into a children's ward in which the forty or more occupants had lived for three or four months during which about thirty of the children had contracted the disease while the others, most of whom were from one to two years of age, escaped in spite of the closest and most constant contact. The contemplated immunity experiment in this instance was naturally abandoned.

During the past eight months at the Research Laboratory about eighty cases of whooping cough had been treated with vaccines and the course of the disease followed as carefully as circumstances would permit. The cases had been treated in institutions, clinics, and in their homes either by members of the laboratory staff or by private physicians and hospital staffs. Three strains of vaccines have been used, the first made from imported Bordet-Gengou strains combined with three strains of hemoglobinophilic organisms isolated from cases of whooping cough; (2) the same imported organism combined with two strains of somewhat atypical Bordet-Gengou organisms from local cases giving a similar complement fixation reaction as the former, and (3) four strains of typical Bordet-Gengou organisms isolated from local cases. The results of treatment had varied markedly, a number of cases showing very distinct and rapid improvement, others seeming to be little affected. The mild character of the symptoms observed in most of the cases since the early Autumn had done much to prevent a definite opinion as to the

real value of specific treatment, many cases not treated running a very favorable course. In brief it may be said that there is an indication of value in many of the cases treated with vaccine but in order to form a really definite opinion it will be necessary to treat many more cases and to have the children under such observation as will render the clinical reports of much more value than they had hitherto possessed.

The present lack of effort to control and care for the disease was a disgrace to the community and it was to be hoped that the Department of Health would continue to direct its attention to this problem. The setting aside of ten additional beds for the care of this disease was little more than an entering wedge. He thought that he voiced the opinion of every physician who had the welfare of the community at heart when he stated that the authorities should take action immediately to solve the problem of a disease which killed nearly five hundred children in the city of New York during the past year and especially that provisions should be made for the care of young children having whooping cough complicated by pneumonia and unable to be placed under the care of a private physician.

DR. HAVEN EMERSON said he had come to listen and not to speak, but he could assure them that the activities of the Health Department would be increased along this line.

DR. S. J. MELTZER asked Dr. Williams whether the statement he had heard made that Mallory had in his experiments the B. bronchosepticus, that was, the distemper bacillus instead of the bacillus Bordet-Gengou was true.

DR. WILLIAMS replied that Mallory has stated as she had said in her paper, that his animal experiments were not sufficiently controlled, that possibly the animals might have had the B. broncho-septicus.

Meeting of April 16, 1914.

The President, WILLIAM M. POLK, M. D., in the Chair.

This meeting was held under the auspices of the Section on Surgery.

THE MEDICAL ASPECTS OF THE TREATMENT OF PYLORIC STENOSIS
IN INFANCY.

DR. L. EMMETT HOLT.—Nearly all that we know of pyloric stenosis in infancy has been contributed since 1897. It seems surprising that it went so long unrecognized. My experience with pyloric stenosis in infancy includes fifty-seven cases, of which number, eighteen were seen in private practice and the remaining thirty-nine were inmates of the Babies' Hospital. The steadily increasing number of cases seen would indicate that we now recognize this condition where formerly it was overlooked. Pyloric stenosis occurs nearly always in breast-fed infants. In my series of fifty-seven cases,

fifty-two were breast-fed. Of these forty had nothing but the breast and twelve had mixed feeding. Hence bad feeding can scarcely be invoked as the cause of this condition. The predominance of the male sex has been noted by all writers. Of fifty-five of my cases in which the sex was noted, there were forty-nine males and but six females. No reasonable explanation for this difference had been suggested. In four-fifths of my cases the first definite symptoms appeared in the third, fourth, or fifth week and in only two during the first week in life. The symptoms are usually abrupt in onset. Pyloric spasm plays an important part in the production of symptoms, and the disappearance of all symptoms in a few weeks in a certain proportion of cases points in the same direction. On the other hand, at autopsy there has invariably been found marked hypertrophy of the pylorus, principally involving the muscular layer. According to this view the symptoms have an organic rather than a functional basis. It is difficult to reconcile the clinical symptoms and the pathological findings with either of these views alone. Definite persistent spasm of the pylorus without hypertrophy is, I believe, yet to be proven. At autopsy, hypertrophy has been in my experience invariably present. There has been too much discussion of terms in this disease. No two men will agree in the classification of cases seen at the bedside, for no sharp division into spasmodic and hypertrophic types is possible. The real question is whether there exists an obstruction sufficient to endanger the child's life and how it may best be relieved.

A better division is into mild and severe cases. Many points in the pathology of pyloric stenosis are still obscure and it is hard to believe that the spasm is the cause of the hypertrophy, and difficult to explain why, if the essential condition is hypertrophy, that spasms are so infrequently seen during the first ten days or two weeks of life. When we come to the clinical aspects of the disease, we find no such divergence of views. The typical case suddenly begins to vomit persistently and forcibly, has marked constipation, steady loss in weight and all the symptoms belonging to failing nutrition. Careful examination reveals definite gastric peristaltic waves and in nearly all cases a palpable tumor in the pyloric region the size of a peanut. The forcible and projectile character of the vomiting occurring soon after meals together with its persistence is characteristic, but visible gastric peristalsis is one of the most important symptoms and I would hardly be willing to make a diagnosis without it. A palpable tumor cannot be considered essential but will nearly always be found by an experienced and careful observer under favorable conditions. In two of my patients who recovered it was noted as late as the sixth month of the child's life. The tumor is usually more evident just before or during the act of vomiting. The decision as to the advisability of operating should not rest upon finding or not finding it, but rather upon how much obstruction is present. In the absence of palpable tumor we are not justified in deciding that only spasm exists, for operation on these cases has often disclosed a typical tumor. One of the most important guides to the

degree of obstruction is the amount of gastric retention. For this purpose the apparatus suggested by Hess for aspirating the duodenum is useful. This means of establishing the fact of obstruction is in my opinion more valuable than the x-ray. Constipation depends only on the absence of food from the intestines. Other symptoms are always present but they are not diagnostic. There is a wide divergence in regard to the methods of treating pyloric stenosis. Physicians have reported quite a large series of cases treated by medical measures alone with so low a mortality as to lead to the inference that nearly all these patients recover if properly treated. On the other hand quite an opposite view is taken by surgeons. They consider the disease a surgical one and urge that the patient be turned over to them for operation as soon as the diagnosis is made. Pyloric stenosis in infancy is accredited with a general mortality of about 50 per cent. Of the fifty-seven cases in my series there were twenty-six recoveries and thirty-one deaths, a mortality of 55 per cent. There were operated on twenty-eight cases, with fourteen deaths; there were twenty-nine cases treated medically, with seventeen deaths. It should be remembered that three-fourths of these were hospital patients and that every case of pyloric stenosis admitted was included, though in a considerable number the condition was hopeless and four were practically moribund when admitted.

The whole crux of the question between medical and surgical treatment of pyloric stenosis seems to be: are the symptoms a condition such as to make it probable that the patient will or will not live long enough for the pathological condition to subside? There are medical risks and there are surgical risks, in the individual case one must decide which are greater; the two must be carefully weighed one over against the other. The medical risks are not to be ignored; they are, I think not sufficiently considered. There is danger from acute inanition or from marasmus. To allow the weight to fall gradually from eight pounds to seven or six, or even lower, is to take great chances and although possibly the majority of the cases may get well, every now and then an unexpected death occurs without warning. There is also the risk of intercurrent disease developing while the child is in an enfeebled condition. Sudden death has been known to occur in cases that were fairly well nourished, where the vomiting had practically ceased and where there was no assignable cause. Another question remains. If these patients get well without operation do they recover completely, or does a lesion remain which may subsequently give trouble? In no instance in which I have been able to follow the subsequent history of the child has there been a persistence of the symptoms into childhood. The period of malnutrition lasted in most of these cases until they were nearly a year old and in some it persisted well into the second year. In several instances hypertrophy of the pylorus has been shown to persist for some months after apparent recovery. We are as yet unable to say how often pyloric stenosis is overlooked in later childhood. Personally I have seen but one case in an older child. That was in a girl four and one-half years of age. In this instance there

was no history of pyloric stenosis in infancy. That the pyloric stenosis of infancy and that of childhood have the same pathological basis is yet to be established. The surgical risks are partly essential and partly accidental. The essential risks are those of shock, non-union because of poor nutrition, and the danger of exhaustion owing to the difficulties of feeding. These are much reduced by early operation. Of much greater importance are the accidental risks largely due to faulty technic. There are also the risks of hemorrhage, leakage, obstruction, infection and other accidents which may follow abdominal operations. With an experienced operator and the patient in fair condition, the operative risk is much less than one would anticipate. The younger the infant the less the shock appears to be. In private practice if the best environment, good nursing and proper medical attention can be commanded, I believe the risks of medical treatment are small, but there will always be a certain number of patients for whom surgical intervention will be required. Even if the surgical risks are considerable they are short, while the medical risks are prolonged and the dangers multiply with the duration of the symptoms. Indications for operative treatment are: (1) no diminution of the vomiting or the gastric peristalsis by stomach washing and diet; (2) a steady loss of weight of 1 or 2 ounces a day; (3) marked gastric retention; (4) absence of fecal stools. The average case medically treated is apt to run a very prolonged course even though the child may ultimately recover. My early experience led me to strongly favor the medical treatment, but I find in looking over the histories that in constantly increasing numbers I have advised early surgical interference. My greatest regret is that operation was delayed in so many and in some not done at all. Given an early diagnosis, a patient in private practice under favorable conditions, operation may not in most cases be required; but in hospital practice, in cases seen late, with acute symptoms and losing rapidly, there is no question but that immediate resort to surgery offers a better chance of recovery. To persist with medical treatment week after week where forcible vomiting and marked peristalsis persist, where the weight shows only a slight loss seems to me to be incurring far greater risk with the child than with operation.

The medical treatment consists of careful feeding and stomach washing. The gastric lavage should be practised twice a day, with the water at 112° F. Breast milk is the preferable food. In default of that a modified milk mixture low in fat should be employed. The quantity and intervals of feeding must be regulated to the needs of the individual case. We usually depend upon 1 to 3 ounces at three- or four-hour intervals, water being given in small quantities between feedings. In children extremely prostrated the Murphy drip is valuable as a preparation for operation, but hypodermoclysis is of greater value. We have been accustomed to use 4 per cent. solution of dextrose in a normal saline solution, giving 4 to 8 ounces twice a day. Rectal feeding is of very little assistance except for a short time. Drugs I believe to be of little or no value nor can

I say more for the local applications of heat over the epigastrium. Cases medically treated must be closely watched.

REPORT OF TWENTY-ONE CASES OF PYLORIC STENOSIS IN INFANCY
TREATED BY GASTROENTEROSTOMY.

DR. WILLIAM A. DOWNES.—My series embraces twenty-one cases; sixteen males and five females. Seventeen were breast-fed entirely; three partly breast-fed and partly bottle fed, and one bottle fed. The symptoms appeared from three days to seven weeks after birth, the average time being three and one-half weeks. In every case vomiting was the first symptom to be noted. It is projectile in character and usually occurs shortly after feeding. The vomitus was frequently examined for bile but none was found. Constipation was marked in every case. A marked loss of weight immediately followed the onset of vomiting and in one case amounted to 2 pounds in one week. With four or five exceptions the babies were emaciated. The lower abdomen was retracted and usually soft, while the epigastric region was full and prominent. All the cases presented at some time peristaltic waves passing from left to right. However, they should not lead to a diagnosis of true stenosis without other more reliable symptoms. To the right of the median line and just below the costal margin a firm movable tumor, about the size of the terminal phalanx of the thumb, was felt in each case with the exception of the first, in which it was palpated under anesthesia before the abdomen was opened. Beginning with the eighth case aspiration was practised as a routine measure, and each stomach was found to have $\frac{1}{2}$ to 4 ounces retention three hours after feeding, even though the vomiting had occurred. They did not consider it necessary or desirable to submit the babies to x-ray examination before operation. On account of the extreme irritability of these stomachs, conclusions based on the emptying time are likely to be misleading. Aspiration has all the advantages of the x-ray and is more feasible. The average duration of symptoms before operation was performed was two weeks and one day. Upon opening the abdomen a pyloric tumor, varying in size from the terminal phalanx of the ring finger to that of the thumb, was found in every case. These tumors were hard, smooth, freely movable and free from adhesions. The pyloric portions of the stomachs were thickened and somewhat edematous and about half of them were dilated. A typical posterior gastrojejunostomy was made in all the cases. Ether was the anesthetic used. The abdominal incision should be one-half to three-quarters of an inch to the left of the median line. The reason for this is that there is so little subcutaneous tissue in these babies that there is difficulty in obtaining union in the median wound, whereas the incision through the rectus muscle heals much more readily. Many postoperative deaths have followed evisceration resulting from nonunion in these cases. Another reason for placing the incision to the left of the median line is the avoidance of the falciform ligament of the liver.

In one fatal case, a large hemorrhage was found where the needle used in closing the abdominal cavity had punctured this ligament. The transverse mesocolon has been opened to the left of the middle colic artery, and the anastomosis made at the most dependent part of the stomach. With the exception of the first two cases stomach clamps were not used. There was practically no leakage from the stomach or intestine, and very little bleeding in these cases. A number of the operations were done in twenty-five minutes; the longest time was forty-five minutes. Haste is the important element, but time should be taken to properly close the abdominal wall.

The after-care of the cases is extremely important and much depends on the judicious use of brandy, atropine and caffeine, and also upon the proper use of fluids by hypodermoclysis and the Murphy drip. Following operation the after-history of these cases was much like the after-history in the average case of gastroenterostomy in the adult. Feeding should be started as soon as possible after operation, small quantities of water alternating with diluted breast milk being given hourly. The amount should be increased gradually and the child put back to the breast by the end of forty-eight hours. It is important to elevate the head of the bed as soon as reaction is well established as this facilitates the escape of gas and lessens the tendency to vomit. A colon irrigation should be given in twenty-four hours or sooner if there is much distention; if not, one or two teaspoonfuls of castor oil may be administered. I have not operated for so-called pylorospasm without hypertrophy, nor do I believe that such cases should be operated upon. The author referred briefly to the histories of his fatal cases, illustrating them by lantern slides. Of the seven fatal cases, so far as was known only one had had careful medical attention and treatment from the beginning of the symptoms, whereas of the fourteen cases that recovered, five were private patients, all of whom had been treated skilfully from the onset of symptoms and had been seen in consultation by either Drs. Holt, Kimball, Kerley or LaFetra. These cases came to operation after a reasonable length of time had been spent in attempting to control the symptoms by medical means; they were still in good condition and made uninterrupted recoveries.

In view of the experience gathered from the observation of these cases I feel justified in offering the following conclusions: 1. Hypertrophic pyloric stenosis is congenital to the extent that there is an increase in the thickness of the circular muscle fibers at the pylorus. The presence of this thickened muscle fiber reduces the lumen of the pylorus, therefore the stomach, in order to empty itself, contracts more forcibly than normal. This soon causes the mucous membrane to become thickened and edematous, and to assume a more or less spiral arrangement as it passes through the narrowed pyloric channel or from one-half to three-quarters of an inch. The result is a valvular action which gradually produces complete closure of the pylorus. The question as to whether or not the pylorus will admit a probe or catheter at operation or autopsy is of little conse-

quence when weighed against the clinical evidence of complete obstruction. 2. That there is sufficient time between the onset of symptoms and the appearance of the signs of complete obstruction for careful observation and the carrying out of any medical measures likely to prove of benefit, there can be no doubt, provided of course that the early symptoms have been properly interpreted. The fear, however, that the condition may have existed longer than has been suspected and that the vitality of the baby is not as good as appearances would lead one to believe, make me feel that operation is indicated in every case of hypertrophic stenosis as soon as the diagnosis is made. Should depression or early evidence of shock be present immediate operation is demanded. 3. That the babies coming to operation in good condition suffer little or no shock, that their convalescence is straightforward, and that they are at once restored to normal health. My experience in this respect corresponds with that of other operators.

In closing it may be mentioned that Dr. Scudder in a recent series of seventeen operations for pyloric stenosis in infants had mortality of four, and Dr. Richter of Chicago has a record of twenty-two operations with three deaths.

DISCUSSION.

DR. CHARLES L. SCUDDER, Boston, Mass.—I am glad to open the discussion upon pyloric stenosis in infancy and to have the opportunity to say a few words on this subject.

The papers of Dr. Holt and of Dr. Downes are extremely interesting communications upon this subject. I think the Society is to be congratulated upon having so fair a statement from the medical point of view, and certainly Dr. Downes' paper is of very considerable importance in connection with the surgical aspect of this subject.

I hesitate to express an opinion at all contrary to the one expressed by Dr. Holt who has had such a wide experience. If there is one thing that it is difficult for the general practitioner or the internist to do it is to feed babies skilfully. If all general practitioners had the skill that Dr. Holt has in feeding little babies they would be competent to take his attitude toward this problem of congenital stenosis of the pylorus. But all medical men are not competent to experiment in the feeding of little babies. Therefore I believe that Dr. Holt's attitude of watchful experimentation in certain groups of cases is not one to be commended to the general practitioner.

In twenty-five years of experimental work with cases of pyloric stenosis in babies it has been demonstrated that the medical treatment by feeding and by drugs in true cases of tumor stenosis has not been satisfactory.

I believe that if we are confronted with a young baby with pretty evident symptoms of pyloric stenosis that we should regard the stenosis as either occasioned by tumor or not by tumor. If there is a true tumor present the sooner surgical measures are instituted the better for the immediate condition and the better for the future of such a baby.

Cases of stenosis not due to tumor are supposed to be occasioned by a certain degree of pyloric spasm. The term pyloric spasm has been introduced into medical nomenclature by the general practitioner to explain the cases of difficult feeding not occasioned by true pyloric tumor. I believe that this expression and this conception of pyloric spasm should be retained. It must constantly be kept in mind, and this I believe to be of very great importance, that the tumor cases of obstruction are real mechanical obstructions. The tumor occludes the lumen of the pylorus. Moreover, I believe that the tumor is probably of congenital origin. There are several reasons for believing that the congenital origin of this tumor is the true origin. The basis for this opinion I need not state in detail, but may remind you that quite recently there has been reported one case of new-born baby, a fetus, in whom there was a congenital pyloric tumor. This fact is of very considerable importance in the proof of the congenital origin of this tumor.

In addition to keeping in mind the fact that the tumor causes the obstruction, I believe it is of equally great importance that the evidence all points to the very great probability of a persistence of this tumor throughout life. The evidence for the permanence of the tumor is of different kinds. The x-ray evidence points to a persistence of the obstruction at the pylorus. The gastroenterostomy stoma is seen functioning and no food passes through the pylorus into the duodenum years after operation by gastroenterostomy. The evidence from the case of Morse-Murphy-Wolbach, reported in the *Boston Medical and Surgical Journal* for April 9, 1908, demonstrates that six and one-half months following a successful gastroenterostomy for congenital pyloric tumor the pyloric tumor existed as at operation six and one-half months previously. The evidence from the cases discovered in adult life suggests that when the obstruction is not complete the individuals live to be adults and that the tumor persists. The demonstration that the tumor is a permanent one is of more than academic interest. I believe that it demonstrates without a doubt the necessity for surgical intervention when the diagnosis is first made in these cases.

I agree with Dr. Holt that the determination of the amount of gastric stasis in these cases will help to determine the diagnosis. I believe, however, that the value of the x-ray is very great and in doubtful cases is a legitimate and helpful means in determining the presence of obstruction.

I should take issue with Dr. Holt that if these babies with true tumor are treated medically for a long enough time they will get over their difficulty unassisted by surgical means. The evidence that I have stated for the permanence of the tumor contradicts this opinion absolutely. There is no doubt that if a baby, with a pyloric tumor which is only partially obstructing, can be kept alive by the amount of food passing through the obstructed pylorus he may continue to live a long time, but the obstruction occasioned by the pyloric tumor I believe will always exist. The individual living with such a par-

tially obstructed pylorus will, if he grows up to adult life, become a weak individual physically, not robust and strong.

The contrast between the rapid improvement in weight, in general appearance, in growth, and in general development in the cases of pyloric tumor operated upon and those cases experimented upon by feeding and drugs is so great that one can hardly understand the attitude taken by certain medical practitioners who advocate long experimental feeding in true tumor cases.

I believe that when the diagnosis of congenital pyloric stenosis is made in these little babies that the earlier surgical measures are instituted the more rapid will be the recovery from the emergency of starvation and the more sure will be the saving of the life of the child. Children with only partial obstruction will develop symptoms later than those with more complete obstruction. Children with almost complete obstruction will demand surgical interference earlier than those with less obstruction.

In the group of cases in which the diagnosis is doubtful, that is, in that group of babies difficult to feed, it will always be justifiable and proper to experiment for a limited time with skilled feeding in order if possible to arrive at a satisfactory diagnosis. I believe that comparatively few cases of so-called pyloric spasm without the presence of a true tumor will require surgical treatment.

DR. HENRY KOPLIK.—The difficulty we encounter in handling these cases is very great; the more we see of them, however, the less difficulty we have in classifying them in our own minds as which case will possibly go through without an operation and which must be operated on as quickly as possible. In other words, after seeing a large number of cases we can group them into certain sets. There is a class of cases that I believe will get well without operation, but it is not always easy to come to this conclusion. There is a certain class of rare cases described as true hypertrophic stenosis, with a hard palpable tumor; these should be operated upon as soon as possible. I have only seen one such case. In the other cases the tumor is soft and palpable; it can be felt to soften and harden under the finger. Peristalsis is not an indication for operation; many cases have peristalsis and recover without operation. In others there is peristalsis long after recovery. Some cases have marked peristalsis and are very mild in their course. Therefore, to conclude from the presence of a tumor and peristalsis that it is necessary or not necessary to operate is dangerous. On the other hand, the amount of stenosis is very important as well as the knowledge of just how much food passes through the pylorus into the duodenum. When no great amount of food passes through the pylorus the sooner the operation the better, before the child becomes too exhausted. I think one of the best signs when confronted with a case relates to the character of the symptoms from the outset. Some cases are stormy, so to speak. The child vomits and loses weight from the start and there are the signs of intestinal intoxication. These are the cases that should not be played with too long. I do not agree that all cases should at once be handed over to the surgeon. Dr. Holt

has made the observation that "if the case lived long enough many would recover without operation." That is true. I have made this observation in my publications. The symptoms seem to subside after the third month. As to cases of pyloric spasm with relative stenosis in later childhood, I have seen one such case due to an ulcer both of the stomach and duodenum. This case was probably congenital. It was operated on and died. Postmortem examination revealed a moderate hypertrophy of the pylorus, probably congenital.

DR. H. M. RICHTER, Chicago, Ill.—Could we agree as to the underlying pathology it would be easier to decide what course to pursue. Among my twenty-four cases, nineteen were diagnosed before operation as hypertrophied pylorus with resulting obstruction, and in five cases the diagnosis before operation was spasm. Of the nineteen cases, eighteen showed a palpable tumor before operating. In the nineteen cases there were certain definite things demonstrable; there was in each case a definite fixed hard tumor. In five cases a diagnosis of spasm was made on the basis of the peristaltic waves of the stomach and the starvation stools. The underlying pathology, however, is surely quite different from that found in the cases showing hypertrophy, and probably does not constitute an entity, but is variable. There is a definite intestinal obstruction in the true hypertrophic cases. The type of obstruction in these cases is similar to the obstruction of the urethra in cases of enlarged prostate; it is a mechanical obstruction from a mass blocking a patent lumen and the distended stomach acts as does a distended bladder in forcing the contents through. Last November in Chicago Dr. Case took ten consecutive skiagraphs of cases operated upon by me at periods varying from a few weeks to three and one-half years and showed that the bismuth in every instance passed by way of the new opening and not by way of the pylorus. As a matter of fact, it is not necessary to show that a tumor exists for years; that it lasts long enough to endanger the infant's life constitutes the indication for operation.

The mortality of gastroenterostomy is high, but it is being gradually lowered. The results published show that the death rate is being lowered continuously. The after-histories of cases treated medically and those treated surgically should be compared. Operative treatment, sufficiently early carried out, enables the breast milk to be saved, in itself an exceedingly important factor. The duration of treatment in nonsurgical cases is prolonged and in a large proportion of these cases the mothers lose their milk. Compare this with the immediate results from operative work. I wish especially to call attention to one point: the bismuth picture should not be relied upon in making a diagnosis. The presence of a tumor does not exclude the possibility of some bismuth passing through the pylorus.

DR. HOWARD LILIENTHAL.—Dr. Downes is certainly to be congratulated on having had the coöperation of medical men who were willing to turn over the cases to him so promptly. Although he has refused operation in no case his excellent record is in part to be ascribed to the early surgical treatment.

An interesting observation is the prevalence of this disease among males and it is suggestive that in adults also disease of the pyloric region is more common in men than in women. Perhaps a further study of gastric chemistry may help us to solve this problem.

I have noted that the location of the tumor in these infantile cases is exactly at the pylorus, the pyloric veins appearing at or near the central part of the mass.

I have operated in but five of these cases. Two died, one from hemorrhage following an operation upon the mastoid which had to be performed three days after the gastro-enterostomy, the other from some error in technic which resulted in a breaking down of the wound.

A short time ago I learned of Ramstedt's operation and, through the kindness of Dr. Koplik, I had an opportunity to test the procedure. The case was reported in the last number of the *New York Medical Journal*. The operation consumed but eight minutes and was extremely simple. I am convinced that this will be the operation of the future.

With regard to diagnosis: When we consider that in all seventeen of Dr. Downes' cases he found the expected pathological condition it means great accuracy. In a recent lay investigation at Bellevue Hospital, the newspapers announced that the correct diagnosis in all sorts of diseases was made in 53 per cent. of the cases and considering all things this is a not unsatisfactory showing. The correct diagnosis in 100 per cent. of Dr. Downes's cases is therefore well worthy of note.

DR. LINNAEUS EDFORD LA FETRA.—My personal experience with this condition comprises fourteen cases. They can be divided into two groups: first, those that had spasm alone, or spasm with more or less hypertrophy but in which the spasm was the prominent feature; and, second, those that had spasm and hypertrophy in which the hypertrophy either was or became the most important factor. It is altogether probable that the cases change from one group to the other, the long continuance of the spasmodic attacks inducing an increase in the hypertrophy; in all the severe cases more or less hypertrophy is present. Also it is probable that the presence of an original hypertrophy which may be small in amount results in spasm which increases the hypertrophy. Of the cases in the first two groups, those of spasm alone or spasm with some hypertrophy, there were eight patients. All of these recovered without operation except one. In two of them operation was advised by other consultants because of marked peristaltic waves and the hard spool representing the pylorus. Three years have elapsed with one of these and two with the other and the children are in perfect health. The one patient that died had a severe spasm with marked peristaltic waves, but no tumor. Necropsy showed a normal pylorus.

Of the cases in which hypertrophy was the prominent feature I have had six; five of these were operated on and four died. The patient that lived is included among those reported by Dr. Downes this evening. The other case not operated on died while the surgeon

was deciding whether an operation was needed. It must be added, however, that three of these cases were operated one at a time when the technic of the operation was new and not so well understood as at present. I should consider that operation is absolutely indicated as the only hope of recovery in all cases in which hypertrophy is the prominent feature.

As regards diagnosis of the condition of stenosis, peristaltic waves are generally pathognomonic. There are, however, exceptions to this; for the most marked peristalsis of the stomach I have ever seen occurred in an infant eleven months old, who was a mongol. The mother had noticed a peculiar swelling in the upper part of the abdomen whenever the child was given a bath. In this infant the hour-glass wave crossing the stomach was very prominent, the stomach wall was thick and could be picked up with the fingers and even the artery at the greater curvature of the stomach could be felt pulsating. The infant did not vomit and never had vomited any more than a healthy baby occasionally does.

The presence of the spool at the pyloric end of the stomach is, of course, diagnostic of pyloric stenosis. It does not, however, necessarily mean hypertrophy, and particularly it does not mean that operation is necessary. All but two of my spasm cases had the spool very well marked and yet they recovered by medical measures. To my mind the most important indications for operation are two: namely, progressive loss in weight together with the absence of any food residue in the stools. So long as one sees evidence of food passing into the intestine he may use medical measures unless the general condition of the child is failing. It should be remembered that after a gradual loss of an ounce or two a day for several days the infant may suddenly go into a bad collapse so that slight indication of a change for the worse in the general condition must be seriously regarded.

DR. ELLSWORTH ELIOT.—I think that we are all agreed that irrespective of pathological conditions the cases can be divided into three groups: (1) Cases that are mild in their course and amenable to medical treatment and who are under the care of the pediatricians. (2) The hopeless cases that come to the surgeon in the later stages of the disease. I congratulate Dr. Downes on his bravery in operating upon such cases. (3) The doubtful cases in which one is undecided as to the propriety of continuing the medical treatment or resorting to surgical measures. I am quite willing to depend upon the pediatricists and to be guided by their advice. In some cases a tumor may be present but palpation is rendered difficult because of overlapping of it by the liver.

With regard to operating, it goes without saying that operation should be done as quickly as possible although, as is well known, children bear shock remarkably well. As a matter of fact the condition of these children is such that they favor this operation. The peritoneal investment or folds are so thin that they are easily penetrated. The danger from hemorrhage is much less because the vessels are so small, and this danger is eliminated.

When the diagnosis is made before operating I do not think it is necessary to waste time with palpation to determine whether there is present a tumor or not. With regard to the post-operative treatment, hypodermoclysis is practically the most essential thing to do after these operations.

With regard to the end results, one, two or three years is not sufficient time to determine the character of the final results. But we have a right in these cases to assume when the child reaches adult life that the results are satisfactory.

DR. ALFRED FABIAN HESS.—My experience with these cases of pyloric stenosis in infants is mainly medical. I have seen in two or three years about twenty cases of spasm of the pylorus. I judged they were spasm and not organic stenosis because in spite of the obstructive symptoms, including vomiting and visible peristalsis, there was no palpable tumor and I was able to pass the No. 15 (F.) catheter through the pylorus into the duodenum. So although slight organic stenosis might have been present it cannot be considered from a medical point of view.

I believe we have to deal with two groups of cases: (1) Organic stenosis with tumor; (2) functional stenosis. Organic stenosis I believe to be of congenital origin. In the fetus the pylorus is large and forms a very great part of the stomach—greater than it does in infancy. If one looks at the pictures of the pylorus of the fetus one is reminded of the pyloric tumors. The only way I believe to settle this question is to find these cases in dead-born children, to find instances of pyloric tumors. We should examine the dead-born children more carefully if we wish to solve this problem. Another way to determine the persistence of this tumor would be, instead of taking an x-ray picture with bismuth feeding, to pass a duodenal catheter at intervals following operation and then with the aid of the x-ray see if we are able to pass the pylorus. If unable to pass this catheter then it proves that there is an obstruction present and we may say that this obstruction exists for years.

In connection with the cases reported by Dr. Holt and Dr. Scudder it must be born in mind that there are some cases that die within one or two weeks of operation, although the operation was successful. I think this is due to overfeeding, to alimentary intoxication. If a gastroenterostomy is performed and then a large amount of milk is fed into the intestines, alimentary intoxication results with fever and death. I have seen a case where the passing of the catheter showed a marked obstruction at the pylorus; there were also clinical symptoms. Of a sudden the obstruction ceased, food appeared in the stools and passing the catheter into the duodenum showed that it entered with ease. Within a few days, however, alimentary fever developed and the child died. In other words, the pylorus had gradually become a protective factor to the child, and when it relaxed the child died from overfeeding.

In addition to other medical treatment I believe that the con-

tinued feeding through the catheter can be well employed in cases of spasm (duodenal alimentation).

DR. MAX EINHORN.—I have had four cases of congenital stenosis of the pylorus occurring in infants and success in the treatment was attained by stretching the pylorus in two of them. I think this is a method that deserves to be used more. The stretching was performed in *all* four of my cases. In one of Dr. Kerley's patients and in one of my own there was a real stenosis and not a spasm and successful results followed this stretching of the pylorus. I tried to measure the lumen of the pylorus by means of a little olive tied to a thread and left in over night. After being left in over night it was pulled out. In two of the cases in which there was a stenosis the results were remarkable and just as good as could have been obtained by surgical methods. After the stretching there occurred quite a change; the stomach began to be emptied and the children began to pick up. One child is now five years old, the other three years old, both are living and perfectly healthy. These were typical cases of pyloric obstruction.

In the other two cases I succeeded in stretching the pylorus but the patients died. There was no stenosis according to my experience, but rather a spasm. Stretching was done in these two cases but without desired success.

DR. WILLIAM A. DOWNES.—No surgeon, whether urged by a pediatrician or other medical adviser, should attempt to operate in pyloric stenosis in infants on the basis of tumor and peristaltic wave alone. Aspiration as advocated by Hess should always be done in these cases. Data from every point of view should be had before resorting to operative interference. In the severe types with complete obstruction, the condition is comparable to obstruction in any part of the intestinal canal and should be treated as such.

BRIEF OF CURRENT LITERATURE.

DISEASES OF CHILDREN.

Extirpation of *Bacillus Diphtheria*.—L. L. Ten Broeck (*Med. Rec.*, Jan. 10, 1914) describes his experimental and clinical work with a thallophytic fungus, *Achlya muscaris*, which occurs in nature as a parasite on the fly. He says that *Achlya muscaris* possesses the power of destroying *B. diphtheriæ* in culture and in the throat. Throat inoculations of this fungus are usually self-limited and may require some adjustment in the way of repeated inoculations or inoculation in special areas or under special conditions to embrace all complications in the nose. It has the power of inhibiting the growth of a number of throat pathogens and seems to influence favorably membranous anginas of various origin. Its clinical use seems to be attended with no danger but after-treatment with mild antiseptics is recommended to remove the fungus. It is applicable in all stages of the disease and seems to give speediest results in the early cases.

There are grounds for believing that a throat in which this fungus is growing is soon shorn of its danger of contagion even if the diphtheria bacilli are still harbored. It is admirably adapted to the clinical requirements for reliable and ready use. These conclusions are offered as established in so far as the limited observations recorded can establish any conclusions.

Measured Feeding for Older Children.—W. R. P. Emerson (*Brit. Med. and Surg. Jour.*, 1914, clxx, 80) believes that the diet of all improperly nourished children and occasionally of well-nourished children should be checked up and controlled by measured feeding. A preliminary forty-eight-hour list, kept without any suggestions from the physician, shows the quantity and kind of food habitually taken as well as the likes and dislikes of the child. Changes in diet should be made gradually along lines of least resistance. Cooperation of both child and parent is necessary for successful feeding. Both should be disabused of ideas and prejudices which interfere with proper nourishment. The average gain on diet alone of children who are under weight should be from one-half to two pounds per week. If no gain is made, organic disturbances or toxic absorption should be suspected. Serious errors in diet cannot be detected by asking the child about his appetite or the mother about the diet given. Food must be recorded and measured in order to show how much is taken. Almost invariably the overweight child is overweight because he eats too much, and the underweight child is underweight because he eats too little.

Food Requirements of Infants.—E. Pritchard (*Brit. Jour. Child. Dis.*, 1914, xi, 49) states that no infant, breast-fed or artificially fed, can be considered to be in a satisfactory condition unless its physiological demand for food is of the following approximate standard. An infant three months old and weighing 5 kgm. (11 pounds) should require not less than 690 c.c. (23 ounces) of breast-milk, or its equivalent, in the twenty-four hours; an infant six months old and weighing 7.5 kgm. (16½ pounds) should require not less than 900 c.c. (30 ounces); and an infant nine months of age should require not less than 1080 c.c. (36 ounces). If, when taking food in these quantities, there is evidence that there is an excessive intake, steps should be taken to increase the demand for food by a revision of the hygienic management of the child. A demand is created when the appropriate stimuli of air, light, and cold are applied. An excessive intake is suggested by an abnormal increase in weight, say of 10 to 14 ounces per week, in a baby under a year old if maintained for any prolonged period of time, dilatation of the capillaries of the cheeks, sweating about the head, and unduly rapid respiration-rate.

"Whey Modified Milk" in Infant Feeding.—According to Schloss the chief reason infants do not thrive as well on cow's milk as on human milk is not because the proteid, or the fat, or the sugar is different, and easier to digest in human milk than in cow's milk, but rather because the percentage and the concentration of the salts are different in the two milks. Schloss devised the following modification of cow's milk, which he called "whey modified milk." To make

one liter of the mixture the following ingredients are used: 20 per cent. cream, 140 c.c.; full milk, 140 c.c.; water, 700 c.c.; KCl, 0.2 gm. For infants under three months, he adds to this: dextrin and maltose, 35 gms., flour, 15 gms., nutrose or plasmon, 5 gms. For infants over three months he adds, instead, dextrin and maltose, 50 to 70 gms., nutrose or plasmon, 5 gms. If flour is used, it must be boiled with the sugar, casein preparation and water for fifteen minutes. If no flour is used, the mixture is simply brought to the boiling point. J. S. Leopold (*Arch. Pediatrics*, 1914, xxxi, 20) has used this "whey modified milk" in thirty infants during the past year, all institutional infants. The ages varied from eleven days to thirteen months. All but eight of the infants were under six months of age. In none of these cases was the condition of the infant made worse by this feeding. No deaths resulted. In some cases, and especially in infants over six months of age, at times it was impossible to induce a gain in weight with this feeding. These older infants remained well in every respect, but for some unknown reason no increase in weight could be obtained. In some of these instances, a gain in weight resulted as soon as a simple milk mixture was substituted for the "whey modified milk." On the other hand, "whey modified milk" seems to be especially indicated in very young infants when breast milk cannot be obtained. Infants take this feeding very well, and, as a rule, have alkaline, yellow, pasty, homogeneous stools, as described by Schloss. Gain in weight is usually observed, if no intercurrent disease is present. This mixture is especially useful in institutions in which breast milk is not obtainable, or is obtained with great difficulty.

Nasopharyngeal and Cervical Glandular Tuberculosis in Children.

—A. D. Fordyce and E. W. S. Carmichael (*Lancet*, Jan. 3, 1914) draw attention to the facts that tuberculosis affecting the nasopharynx in children under one year of age, and especially those under six months, has a strong predilection to spread up the Eustachian tube, and that it invariably occurs in children fed with cow's milk. One gland or set of glands in the neck is more liable than any other to be the site of infection. The gland is situated immediately below the posterior belly of the digastric, and between the internal jugular and common facial veins. Tuberculous infection of the tonsil is now known to be extremely common. It is chronic in type and leads to fibrosis and shrinkage of the tonsil. When the disease reaches the outer boundary of the tonsil it sets up a peritonsillitis, which is often somewhat acute. Glandular tuberculosis follows as a secondary infection. The occurrence of sore-throat and acute and marked glandular enlargement is no evidence of the period of onset of the tuberculous infection, and in most cases the tonsil has probably been the seat of a latent tuberculous infection for some considerable time previously. Generally speaking, the younger the child affected the more acute is the course of the disease. The first evidence of the presence of disease is the appearance of a single mobile gland in the side of the neck. This gland may lie latent for years, and, beyond a slight variation in size from time to time and an occasional slight attack of periadenitis, it does not attract much attention. A focus in its

substance, however, may at any time become active and lead to the formation of an abscess.

Treatment of Rheumatic Endocarditis.—W. P. Lucas and M. H. Wentworth (*Amer. Jour. Dis. Child.*, 1914, vii, 41) outline the treatment of various types of endocarditis which are seen in an out-patient department. This includes removal of any source of infection, supervision of diet, and especially rest. These are secured by carefully prepared diet lists and the keeping by these children of diet books putting down just what they have eaten. All directions are written out. The schedule of life given in written form calls for rest for so many hours, at stated periods, and describes what we mean by rest, the types of activities permitted and what are not permitted. Then the patients keep a record of just what they do, and how long they rest. The plan which the writers would suggest for a study of cardiac cases among children is as follows: There should be a general survey of the actual number of cardiac patients attending the hospitals and public schools, and an estimate of the number of children with the first attack who should be in some institution, as a cardiac sanatorium, for a shorter or a longer time. How large this number is it would be impossible to state without such an investigation, but that such a sanatorium is needed in every community is beyond any question of doubt. This sanatorium should be built on the cottage plan, because it would not be advisable to have a large institutional building for such cases, but they would do better if they were grouped by ages and more or less according to the temperament as well as according to the extent of the cardiac lesion and the amount of activity allowed. Some cottages would be, in this way, for cases that could take very little exercise, other cottages for those who had graded up to a considerable amount of exercise and were just about ready to be discharged. There should be an estimation of how many of these cardiac cases could be cared for at home, if they were properly supervised and followed up as outlined above. An estimate of the number of practically incurable cases and cardiac cripples should be made, and some means of reaching these children educationally, vocationally and recreatively should be attempted. In many cases these patients can be made self-supporting, and their lives made comfortable to themselves and no longer a financial burden to their families.

Neurotic Vomiting in an Infant.—The essential features of the case reported by W. B. McClure (*Amer. Jour. Dis. Child.*, 1914, vii, 48) were: The sudden onset of vomiting at the age of three and one-half months, with retention of breast milk while artificial food was vomited, and the persistence of the vomiting despite the great variety of liquid foods given, with cure resulting promptly on giving semi-solid food. The usual causes of persistent vomiting having been satisfactorily excluded, the vomiting was explained as a neurotic manifestation. The apparent willfulness of the vomiting, as suggested by the movements of the lips and jaws, with the seeming satisfaction at its completion; the mode of cure (the baby, for a long time after feedings of farina were given, continued the movements of the lips and jaws, but was unable to regurgitate this semi-solid

food); and the evident neurotic constitution of the child, as shown by the acquiring of the head-rolling habit, supported this explanation. It seems not unlikely that there is a considerable number of instances of chronic vomiting of this type which either go unrecognized or, when recognized, are found difficult to cure.

Stomachaches Associated with General Infections in Childhood.—

H. T. Gray (*Practitioner*, 1914, xcii, 26) is convinced that many of the intestinal and dyspeptic troubles of later life owe their origin, in part at least, to intestinal disorders in childhood. These not only originate from the artificial conditions under which we live with regard to unsuitable food, etc., but may arise in some instances from repeated acute, or persistent and untreated chronic, general infections. It is our duty to control or to remove the exciting causes of these lesions, before they have advanced to such a degree as to cause permanent gross changes in the intestine or its mesentery. As the commonest sources of general infections in childhood are the mouth, teeth, fauces, and naso-pharynx, together with secondary infections of the ears, cervical glands, etc. Particular attention should be paid to these as well as to the routine control of the diet, to the presence of worms, etc., as points in the treatment of chronic abdominal pain. Thus we shall be called upon less often to treat, both in children and adults, some of the grave intestinal disorders, of which chronic "stomachaches" are not infrequently the neglected warning.

Importance of Treating Weak Feet in Childhood.—

B. H. Whitbeck (*N. Y. State Jour. Med.*, 1914, xiv, 15) reminds us that weak foot is the most disabling and widespread of all postural deformities affecting all classes of society and occupation. A decidedly large number of cases exist from early childhood. As the result of various causes, faulty attitudes are assumed for the feet which, though not necessarily causing disability in childhood, are nevertheless powerful factors for harm in adult life. Several causes may be mentioned which produce weak feet in childhood. Congenital conditions of general weakness or abnormal development, overweight of the body, bringing undue strain upon the feet, a prolonged illness or general malnutrition when the muscular power is greatly below normal, and lastly of great importance, the improper attitudes assumed by children either as the result of the other mentioned causes or through faulty education or badly constructed shoes. We can all remember from our own childhood the advice of the parent, the school teacher and the dancing-school teacher to walk with the toes turned out. It has been through the ages wrongly considered the proper attitude of the proper child. Badly constructed shoes designed to please the eye and not the foot, with pointed toes, high heels, and made upon a last which encourages abduction of the foot, act as powerful factors in the causation of weak feet. The proper treatment of this condition in childhood is essential to the prevention of disability in adult life, when interference with occupations is a serious matter.

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